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OBSTETRICS.

BY

CHARLES D. MEIGS, M.D.

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OBSTETRICS:

P. L. Simmons.

THE SCIENCE AND THE ART.

BY

CHARLES D. MEIGS, M. D.,

PROFESSOR OF MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN IN JEFFERSON MEDICAL
COLLEGE AT PHILADELPHIA; LATELY ONE OF THE PHYSICIANS TO THE LYING-IN DEPARTMENT
OF THE PENNSYLVANIA HOSPITAL; VICE-PRESIDENT OF THE PHILADELPHIA COLLEGE
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THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA; OF
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TO THE

EMINENT WESTERN PHYSICIAN,

PHILOSOPHER,

GENTLEMAN AND SCHOLAR,

DANIEL DRAKE, M.D.,

OF

CINCINNATI.

38092

PREFACE TO THE SECOND EDITION.

THE first edition of my work, though a large one, being exhausted, I have now the pleasure to offer to my medical brethren in America, a new one, considerably augmented as to the text, and which I have endeavored to improve by recasting some parts, by cancelling others, and by an earnest attention to improvements in the literary execution of the whole.

I shall not here specify all the changes that I have made in preparing this second edition, for the reader will be the most competent judge of them; and it is for him alone to decide, whether my labor shall prove serviceable in the object we should all lay to heart, of extending farther and wider the usefulness of our calling amongst the people.

It may not be out of place, however, to say that, besides the relation of new cases, the recasting of my remarks on Cyanosis, and many fuller explanations of motives in practice, I have substituted for the former chapter on Puerperal Fever, a new chapter under the head of Child-Bed Fever. In that chapter, I trust, I shall be found to have made somewhat more clear and intelligible, the views that I deem most important upon the nature, seats, causes, and treatment of that disorder; and that I have, also, set forth with sufficient clearness, the motives that have long impelled me to reject the doctrine of its contagiousness. If only this part of my work should be favorably received by my brethren, I shall ever consider that I have, in it, done an acceptable service.

Lastly, I feel most grateful for the kind reception heretofore given, in this country, to my contributions to medical literature, and most thankfully acknowledge my obligation to improve them as opportunity arises; but this sentiment is blended with regrets, that, amidst the agitations, the distractions, and the fatigue of a physician's life, less time is allowed me for revision than is demanded by the many demerits of all that I have hitherto written.

CHARLES D. MEIGS,
324 *Walnut Street.*

April 3, 1852.

A LETTER.

My Dear Sir:

Having taken the liberty to inscribe this work with your name, which I never pronounce without a feeling of affectionate respect, I desire to say a few words to you in explanation of my views and wishes in regard to the volume.

You may haply be aware that I caused to be printed, some years since, a small volume, entitled the "Philadelphia Practice of Midwifery:" a second edition in octavo form, and somewhat enlarged and amended, has now been for a considerable time exhausted; and although I have had proposals to publish a third edition of the Treatise, it has not been convenient for me to undertake the labor until the early part of the past summer.

Upon completing my arrangements with the Publishers, and commencing the task, I was induced to recast and rewrite a great part of the work; in which I did not wholly reject the fruits of my studies in earlier years. This Treatise is, however, so different from the former, that I conclude I have a just right to present it to you as a new one; and accordingly have adopted a new title, as you will have seen.

I have addressed it to the Student, and it is to him that I speak in every page. This I have done because I was not to presume to instruct those who know as well, or perhaps better than I, every point of duty appertaining to the vocation of the accoucheur, both as to the Science and the Art. I was well aware that there are many of my brethren in this country who publicly relate their experience, and explain the rationale of all the Art and Science of Obstetricy to large classes in our numerous medical schools; and I had no pretensions to know more upon these subjects than they, nor to instruct them. Induced by these views, I have been, perhaps, too elementary in some parts of the work, and addressed the Student only; but I hope it will be found that the explanations I have given may serve to remove difficulties from the track of the Medical Student, while they may perhaps lend facilities to the progress of the young and not much experienced practitioner. I thought that young accoucheurs, who, in the distant and thinly settled parts of the country, might require a consultation where time and opportunity would not allow of it, could find herein some needful counsel and explanation, and that it would be for me a great happiness to be useful in such emergencies. Hence I have entered into many particulars, and even trivials, that are not commonly set down in the books.

As to the scientific part of the work, I may say that I hope it will be useful to the Student. If I have succeeded in exhibiting just views in that department, my labor cannot be without fruit; since it is only by such means that the vocation of the Surgeon-accoucheur can become an elevated one. It is the science of the practitioner that raises him immeasurably above the most dextrous midwives of the land, dexterity which indeed does not prevent their ignorance from rendering them unsafe depositaries of such important interests as those that concern the conservation of our wives and daughters, and their little children. An accoucheur who is merely dextrous, and who is not acquainted with the scientific parts of his profession, may be in a manner superior to the midwife, but in some regards he is inferior; since to his employment, his sex is an objection, which ought to be waived only in consideration of his Scholarship.

I have in all this treatise endeavored, upon suitable occasions, to inculcate good motives.—Good and pure motives are very essential to the honorable estimation of this department of Medicine and Surgery.—I believe that the sentiments of good Monsieur Viardel, on these points, are quite just, and I shall take leave to cite the following fragments from his book at p. 261. M. Viardel, who was in full practice at Paris about 1670, in speaking of the Accoucheur, says:—

"Il doit être propre dans ses habits, mais toutes fois vêtu modestement, et non en fanfaron; * * * * * * * * * * il doit, de plus, être doux dans ses paroles, et agréable dans sa conversation; * * * * * * mais surtout, il doit être prudent et discrét: prudent à dresser son prognostic, et à prévoir ce qui doit arriver, de peur de n'encourir le blâme des assistans. Il doit être discrét, et ne point réveler le secret qu'on lui aura confié. * * * * En un mot, il doit être patient pour ne pas se rébuter, humain et charitable, surtout envers les pauvres, et n'agir pas dans son travail pour le lucre et son intérêt propre, mais comme dit l'Apôtre, pour l'honneur et la gloire de Dieu et pour consérver sa reputation parmi le monde."

Like all books, mine has some iterations; but I thought that, to make my pages useful, it was inevitable to repeat statements; without which, I could not inscribe the why and the how on the same pages. If this is fit to be a book of consultation, it will be more useful for this fault. Hippocrates says that art is long; still, I think that, to repeat, is really to abbreviate; for the η δε τεχνη μακρη, and the η δε κρισις χαλεπη, both vanish under a clear and comprehensible delineation of the Why and the How for every special occasion.

I think you will find that I have in this book given a very clear relation of the new doctrines of menstruation, and that I have shown the Student the whole history and progress of the discovery of the mammiferous ovulum, from the time of the detection of the germinal vesicle by the Breslau professor, down to the last, most complete and admirable exposition of the whole subject by M. Coste, of the College of France. If this part of my publication is full and clear, I cannot doubt of its being advantageous. If I have done but this, and no more, I shall look confidently for useful results to my labor. For I know that multitudes of the younger class of my medical brethren, and especially of those that still belong to the Student-class, were formerly grossly neglected as to their instruction in these particulars. No one should be sent forth with a diploma certifying his acquaintance with all the branches of Medicine, whose therapeutical course, while uninformed on the questions referred to, could not but be a mere succession of conjectures and blunders rather than the sure steps of a learned and accurate reasoner.

Apologetically, I pray the reader may know that the labor of this writing and publishing, added to my professional vocations, has been so severe as seriously to affect my health—to that degree, indeed, that I have been compelled to finish it by the assistance of an amanuensis, who has written at my dictation, and read the proof-sheets. I have not dared to examine the proofs of the last 250 pages, on account of a distressing neuralgia of the eyes, which has also prevented me from reading any book or considerable pamphlet since the autumn.

It may be that I ought to solicit from my American brethren, a favorable acceptance of this work, the fruit of many years of painful toil in the acquisition of clinical experience and knowledge. I abstain from doing so, not because I desire not such acceptance, but only upon the certain conviction I have, that the book is no longer mine—and that, in going forth from my hands, it hath found many owners, each of whom will and ought to treat it as may seem good in his own sight.

As for you, my dear friend, I invoke your favorable construction of my design and action in publishing this treatise; and I pray you to believe that I am, with the greatest sincerity, your most obedient and most faithful servant, and attached friend,

CHARLES D. MEIGS.

PHILADELPHIA, *Feb.* 1849.

To DR. DRAKE,
PROF. OF THE PRACT. OF MED., *Univ. of Louisville, Ken.*

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OBSTETRICS.

PRELIMINARY OBSERVATIONS.

MIDWIFERY is the art of assisting women in labor. It has been an art since the days of the patriarchs.

Midwifery is an Art; Obstetricy is a Science.

Obstetricy comprises the sciences of anatomy, physiology, and pathology, as relative to the reproductive organs; and the arts of therapeutics and surgery, as applied to sexual affections in women.

A Midwife or Accoucheur is one who assumes the conduct of cases of labor.

An Obstetrician is a physician, who, to a general knowledge of physic and surgery, adds the special information that is necessary for one having the peculiar charge of all sexual affections—whether in the department of Midwifery proper, or in other instances of the sexual maladies.

Notwithstanding Obstetricy is constituted of several different branches or sorts of knowledge, it claims to be considered as a distinct Science.

This claim it could not properly set forth or maintain, until, in a modern age, when a Method or Classification of the items of which it consists, has been with some success attempted.

The writings of the ancients, whether the Greeks, Romans, or Arabians, upon obstetrics, deserve not to be held as scientific works; nor do the productions of Paré, Guillemeau, Lamotte, Mauriceau, or Deventer merit so high a title.

Of the English writers, neither Thomas Rainald, Chapman, Giffard, nor Burton, rises to the elevation of a scientific author; whereas, Smellie, Denman, David D. Davis, Collins, Dewees, Robert Lee, Churchill, and many others have produced works whose scientific pretensions cannot be denied. It is, perhaps, unnecessary in this conjuncture to name the names of Levret, Baudelocque, Gardien, Velpeau, Wigand, Nægèle, Jörg, Stein, Carus, Lowenstein, Kiwisch, and many other French and German philosophers, who have treated of our subject with an order, precision, clearness, and dignity, that place its claims to be regarded as a science beyond cavil.

While I contend for the claim of Obstetricy to be regarded as one of the Sciences, I admit the difficulty of discovering a perfect Method or Classification of the items of knowledge that compose the sum of it; and, perhaps, it may be contended that a method is essential to the nature of a science. It may be that ours is not a science, but only a collection of items of disjointed sciences, a century of sciences. Our difficulty consists in the distinctness and the absolute isolation of many of the facts or integers of the science, and the absence of any natural order or series in them; its items being rather fitted to be gathered together in a set of collections, or fascicles, than in a regular sequence of books or chapters. It is hard indeed to say what methodical connection there is between a chapter on retroversion of the womb and one on the history and application of the forceps; or what alliance betwixt the sacro-sciatic ligaments, and a crural phlebitis, or a mammary abscess?

In zoology there is a scale or gradation of the integral items of the science, resting on the constitution of the nervous mass of the different divisions as well as the species of animals. In mathematics, or the science of numbers, there is also a gradation, a scale, or regular series, all the integers of which have a relation to each other.

There is, however, in obstetricy, a Method or classification of the several subjects of contemplation that may serve to indicate to the learner or student the place in which he ought to find the special object of his search.

Though I am fully persuaded that we have in our branch no natural method; still, without seeking for novel divisions and classifications of the matters to be discussed in this work, I propose the following course or order of studies.

I shall treat of—

I. The anatomy of the parts concerned in the act of reproduction, with remarks on their pathology and therapeutics.

II. The physiology of reproduction.

III. The therapeutics and surgery of midwifery, or the obstetric art.

IV. The history and diseases of the neonatus, or young child.

Here, it seems, are four divisions, classes, or branches of obstetricy: each one of which is susceptible of being treated of in a separate book, or volume; and this is, to say the least, a classification, and one easily to be remembered. But, in order to the greater convenience of the reader, I shall occasionally prefer to transpose, according to my own pleasure or my own views of what may most conduce to the easy and rapid progress of the student, the various facts, precepts, and doctrines, from one department to another, without rigorous reference to the order or method. The above arrangement shows that our obstetricy is a science, in so far as a method is necessary to that title: for it is clear that, by dividing the subjects of this volume in the manner now mentioned, we have it in our power to reduce to classes, genera, and species the various topics or facts to be exposed—and thus, with proper painstaking, to make of this book a kind of ledger, in which shall be found posted up, at page and column, all the particulars that we may deem it proper to enter in the pages.

Cuvier, in the Introduction to the *Règne Animal*, says, "There can be only one perfect method, and that is a natural method. This is the title given to an arrangement, in which, beings (*subjects*) of the same genus are placed nearer to each other than to beings (*subjects*) of any other genera, those of the same order nearer together than to those of other orders, and so throughout the arrangement. This is the ideal method to which everything in natural history should tend; for, it is evident, if it could be attained, we should be in possession of an exact and complete expression of all nature. In a word, a natural method would be the whole science; and every step towards it carries the science nearer to perfection."

In proposing a division of the subjects of this work as above, notwithstanding the absence of what might properly be called a natural method, I venture to assume that a *method* may be secured.

In the physiology of reproduction, we should require only a few subsections, as first, ovulation—second, fecundation—third, conception, with its varieties and connections—fourth, development of the embryo and fœtus, with its peculiar attributes. The class of anatomy should comprise doctrines of the bony pelvis, whether normal or diseased, those of the external and internal genitalia and mammary apparatus.

Obstetric pathology includes diseases of women, therapeutics, and surgery.

Experience teaches that, even in Natural history, an exact and perfect method has not yet been attained. Nevertheless, so great have been the improvements in method, that naturalists have little embarrassment in mastering the multitudinous items of which their science consists, in comparison with the difficulty of arriving at certain conclusions in our branch of knowledge or science, in which is mixed up with a pure natural history, an unspeakable amount of psychological and metaphysical cognitions.

Inasmuch as all the particular items of obstetrical knowledge must have an ultimate reference to the anatomical structures concerned in reproduction, I shall, following the custom of the moderns, commence with the osteological part of our anatomy, and proceed at once to describe the obstetric pelvis—or the female pelvis.

PART I.

ANATOMY OF THE PARTS CONCERNED IN THE ACTS OF REPRODUCTION.

CHAPTER I.

THE PELVIS.

THE Pelvis, obstetrically considered, is a bony canal or passage which encloses and protects the internal organs of generation, and through which the child is thrust in labor.

The internal form and the dimensions of the pelvis, in all the mammiferous quadrupeds, are conformable to the shape and magnitude of the fœtus that is destined, at term, to be transmitted through the canals or passages in question; and, as any want of such conformableness may impede or prevent the accomplishment of the act of parturition, it is of the highest moment to the patient that the obstetrician should be accurately informed upon all the particulars both of the pelvis and the fœtus, as they are related to each other in midwifery.

Further, as the genital organs, both external and internal, are attached to, and supported and protected by the osseous pelvis, and as both they and the child are liable to injury from the resistance of the solid bone against which they are pressed in labors, no accoucheur ought to be held competent to have charge of cases in midwifery who has not previously given due attention to the study of the pelvis and fœtus.

The exterior surface of the pelvis belongs to the province of the anatomist and surgeon: it is only with the interior aspect of it that the accoucheur is interested.

By the Greeks, it was denominated πελυς; by the Romans, *pelvis;* the Italians call it *il bacino;* the Spaniards, *la pelvis;* the French, *le bassin;* the Germans, *das beckens.*

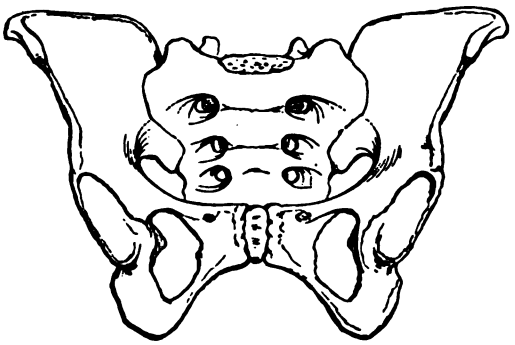
In all these languages, in speaking of the pelvis, the idea of a bowl or basin is expressed.

I annex a cut which represents the pelvis, and which shows its supposed resemblance to a basin or bowl.

The resemblance is certainly a forced one, as is evident on observing that the bottom is broken or wanting, which is the case also as to a large portion of the front edge or side both above and below.

Admitting, in accordance to custom, that the pelvis is a basin, it is seen that the upper part consists of a segment of a larger sphere than the lower part.

Fig. 1.



This difference has led to the division of it into the upper and lower, the greater and lesser, and the false and true pelvis, or basin.

This division is found at a line or ridge, called the linea ileo-pectinea; a raised line or bead, that, commencing in front and passing backwards, left and right, runs from the pubis, in front, to the top of the sacrum, on the back part of the basin. The top of the sacrum is the part upon which the lowest lumbar vertebra or segment of the backbone rests.

The linea ileo-pectinea, which serves to contract the pelvis, is the boundary betwixt the true and false pelvis. It constitutes the boundary or outline of the superior strait; and an imaginary superficies, bounded by it, is the plane of the superior strait. All that part of the pelvis that lies above this plane is the upper basin; whereas, all that is below it, is the true pelvis, the excavation, the cavity. I shall commonly speak of it as the EXCAVATION.

The word strait, in this connection, means narrows, stricture, contraction; and it is truly a narrows, inasmuch as the superior basin widens hence upwards, while the pelvis in the excavation is become more capacious, or of greater diameter than it is at the narrows.

The superior strait is, by some writers, denominated the entrance, the inlet, or the abdominal strait; and this, in contradistinction to the inferior strait, the outlet, or perineal strait, which is also a narrows.

Thus, it is seen that the female pelvis, like an hourglass, is contracted in the middle.

A child, to be born, must pass down from the false pelvis, through the superior strait, into the true pelvis or excavation; and when by means of the mechanical power of the bony walls thereof, it has been subjected, in the excavation, to certain changes of position, it is next driven out of the true pelvis, passing through the inferior or perineal strait. In like manner, a ship sailing on the Black Sea may pass the upper Strait of the Dardanelles into the capacious Mediterranean, from whence it passes through the lower Strait of Gibraltar into the great ocean.

A pelvis consists of two coxal or hip-bones, a sacrum, and its appendix, the coccyx.

The wide upper basin is composed of the expanded concave plates of the coxal bones, which, in a skeleton, are so fashioned as to leave the appearance of a deficiency in the front edge of the bowl. This deficiency is supplied, in the recent or living subject, by the tendons of the oblique muscles, by Poupart's ligament, and by the recti and pyramidales muscles.

A deficiency behind is made up by the lumbar vertebræ which rise upwards betwixt the posterior edges of the coxal bones.

The soft tissues that supply the defect in front, admit of changes in the shape of the bowl, which is ductile there; while it is firm and unyielding posteriorly and upon the sides, which consist of solid bone.

The lower, or true pelvis, is composed of the sacrum and coccyx behind; a portion of the ilium and the ischium, on the sides; and the pubis, in front. Each coxal bone is made up by the union of the ilium, the ischium, and the pubis.

The superior basin, in a fine specimen now before me, Fig. 1, measured transversely at the highest part, is 9.5 inches diameter.

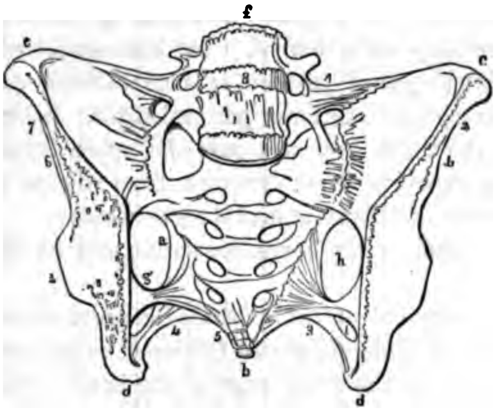
The inferior basin, also measured transversely, at the linea ileo-pectinea, gives 4.6 inches in diameter.

The greatest depth of the upper bowl down to the plane of the superior strait is 2 inches.

The greatest depth of the excavation, measured as a chord line from the top to the bottom of the sacrum and coccyx, is 5 inches.

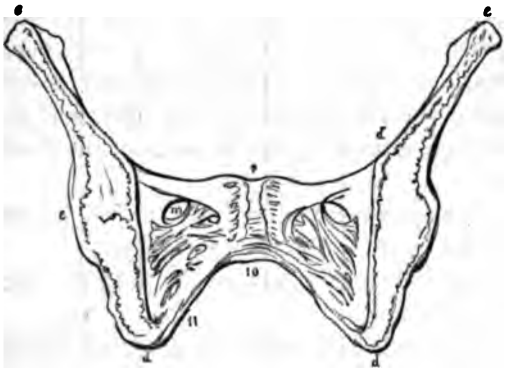
The figures 2 and 3 represent a transverse section of the pelvis, by which it is cut down through the planes of the ischia. They serve to exhibit the form of the interior of the pelvis, seen from before backwards and from behind forwards: *f* is the fourth lumbar vertebra and the intervertebral ligament; *c*, *c*, the crista of the ossa ilia: *e*, the acetabulum; 6, 7, the dorsum of the right ilium; 2, 6, the dorsum of the left ilium; *b*, the point of the coccyx; *d d*, the tuberosities of the two ischia; *a*, *h*, the sacro-sciatic foramina; *g*, the lesser sacro-sciatic ligament; 3, 4, the greater sacro-sciatic ligament; 5, the coccyx. The bony sides of the excavation are seen to be planes—the planes of the ischia; which approach, or are so inclined towards each other in descending as to make the transverse diameter of the inferior strait smaller than that of the superior strait.

Fig. 2.



The third figure exhibits the arch of the pubis seen from behind, and represents the anterior half or anterior segment of the pelvis.

Fig. 3.



The depth in the middle, or at the sides is 3.5 inches, and in the front of the bowl, just behind the symphysis pubis, only one inch.

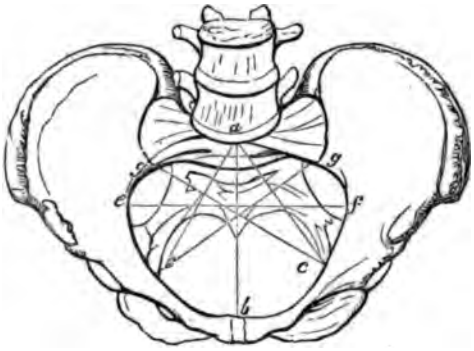
The shallowness of the excavation in front is owing to the arch of the os pubis, which is the semicircular arch in front, 10 in the engraving, in which it is seen that the crown of the arch approaches the top of the pubal bone 9, from which it is distant only one inch. This figure shows the form of the arch as seen from behind—the pelvis having been sawed through in a transverse direction for the purpose of showing the arch: *e* is the acetabulum, *c c* the cristæ of the ilium.

This extreme shallowness in front gives good reason to speak of the pubis as a bar-bone. It is a bar against the escape of the child, which cannot be born without going underneath that bar-bone.

I refer the reader again to the figure of the female pelvis at page 54, by inspecting which, he may readily make out the upper basin of the pelvis as distinguished from the lower basin: also the narrows or superior strait, and the arch of the pubis; while at the bottom of the lower pelvis he will see what is called the outlet or inferior strait, or perineal strait.

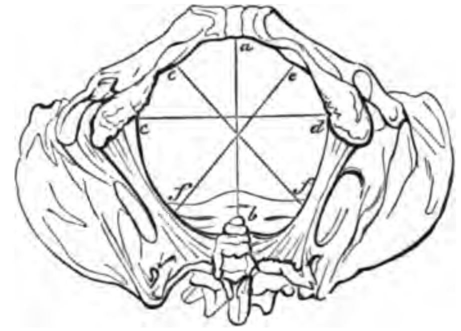
The figure here annexed exhibits the form of the superior strait as it appears when seen by looking at it in a direction from above downwards. It is shaped like the heart on a playing card. The lines *a b*, *c g*, *e f*, are the diameters of the strait.

Fig. 4.



I also insert a cut which represents the form of the lower or perineal strait, seen from below. Its form, though symmetrical like that of the superior strait, seems less regular in its outline. It fulfils the design, however, to which it was appropriated, as perfectly as the more elegant form of its fellow; and it will be found, upon prosecuting the study of the organ, that this particular aperture is admirably adapted, not only to render more secure the fruit of the womb during a pregnancy, but to give passage to it in labor. The lines that cross it in different directions, *a b*, *c d*, *e f*, *e f*, represent its diameters. The student ought always, in studying this part of his subject, to have at hand a good specimen of the female pelvis; but he should take notice that, in the recent or living subject, these bony surfaces are invested with divers tissues, and sustain various organs whose bulk and consistency give to the bony cavity an appear-

Fig. 5.

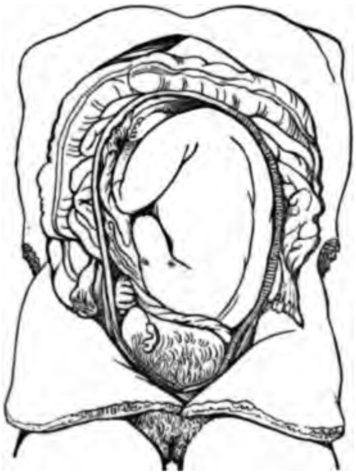


ance and capabilities exceedingly different from those of the dried specimen.

The two small bones seen in the front of the pelvis, and which are respectively called the right and the left os pubis, are firmly and immovably united together by a fibro-cartilaginous ligament; and the triangular bone situated behind, and which is, in fact, a collection of consolidated vertebræ, is held in the strongest union to the side pieces or hip-bones, by means of a fibrous substance, called the auricular ligament, which union is rendered vastly more solid and indestructible by means of a quantity of ligament upon the exterior of the sacrum and hip-bones, as well as by other fibrous bands, called sacro-sciatic ligaments. All these ligaments are most economically adjusted, in order to avoid any encroachment upon the space required for the transmission of the child in parturition, to which end they are distributed either upon the external surface, or they are adjusted betwixt articular surfaces, so as in no wise to diminish the capacity of the straits or the excavation. Meanwhile, the whole structure acquires, by means of them, the requisite strength and solidity; a strength that is, perhaps, greater than if they had consisted of a single bone.

The obstetric pelvis has a necessary relation to the magnitude of the child passing through the straits and excavation. A child at term is eighteen or twenty inches in length, and it is obvious that it must, while within the womb, be strongly flexed, the head being bent forwards upon the breast, the thighs flexed upon the belly, and the legs flexed upon the thighs, while the arms are pinioned against the sides in front of the thorax, in flexion.

Fig. 6.



This state of universal flexion gives to the fœtus the shape of an olive, Fig. 6. The olive-shaped mass is about twelve inches in its longitudinal, and four inches in its conjugate diameter; whence it is evident that, in a labor, one pole of the olive ought to present itself to the straits, which are large enough to give passage to a body only four inches in diameter.

Can the student suppose that it is a matter of serious import to the woman, whether the cephalic or the pelvic pole be the presenting part?

Not so, however, as to the fœtus—to whom it is of immense importance that the cranial pole should be the first to descend. The cut exhibits the olive-like form in which the fœtus lies packed in the womb, and it ought to show that it is nearly indifferent as to the mother's interests whether one or the other extremity of the fœtus approaches the os uteri.

In order to obtain very accurate notions of the pelvis, all the portions of which it consists ought to be separated and studied, each in succession; to which end, I shall now proceed to enumerate them. They are eight pieces, whose names are as follows: the sacrum; the coccyx; the right ilium; the left ilium; the right ischium; the left ischium; the right pubis, and the left pubis. Thus, the student becomes master of the names of the eight pieces of which a pelvis is composed.

As to its shape, the sacrum is a triangular pyramid. The inner face is larger than either of the two outer faces: it is concave, whereas their faces are convex. Hence, the pyramid is bent towards the excavation, and its concave face is what is called in midwifery the hollow of the sacrum.

The sacrum has the following parts that are worthy of notice:—1, the base; 2, the apex; 3 and 4, the two edges; 5 and 6, the two auricular facettes; 7, the sacral foramina; 8, the concavity or hollow.

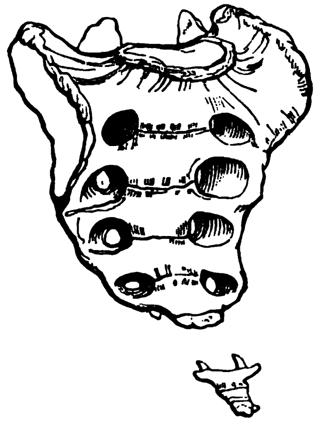
The base is of a triangular shape.

At the base is to be seen the articular surface by which the bone, covered with its intervertebral cartilage, was united to the last lumbar vertebra. The anterior edge of that articular surface is the most salient point of the promontory of the sacrum; and there, also, is found the sacro-vertebral angle, so called, because the lumbar spine and the sacrum are joined together so as to make an obtuse angle at the place of junction. The words promontory, projection, and sacro-vertebral angle are used as synonymous terms.

The sacrum is fully four inches wide, measured from wing to wing, at its base. In descending, it becomes narrower down to its apex or point, upon which is an oblong or oval articular facette, by which it is united in the living subject to the os coccygis.

Behind the edges of the sacrum, where the bone is broad, is seen upon either wing a smooth surface shaped like the human ear, whence it is called the auricular surface. There is a similar one on each hip bone or coxal bone, for the purpose of articulation. A strong fibro-cartilage, called from its form the auricular cartilage, passes from the sacral to the coxal surface; it is about a sixteenth of an inch in thickness. It has no synovial cavity; and is so very strong that a considerable effort is required to separate the bones, even when held together by this ligament only; sometimes it becomes ossified. There are samples of labors in which even this powerful bond of union has been broken by the violent efforts of the patient in thrusting the child through a pelvis too small for its passage. The adjoining figure of the sacrum represents its form very correctly, as seen in looking upon its front or hollow surface. It is about four inches long, and at the widest part the breadth equals the length. This surface constitutes the posterior wall of the excavation of the pelvis. There is observed a double vertical row of holes or foramina for the transmission of nerves that come off from the brush-like extremity of the spinal cord. Four holes are to be counted in each row; occasionally a specimen is seen to contain five in each row.

Fig. 7.



By filling these holes with putty, and pouring water upon the surface while holding the bone in a horizontal position, the cup will be found deep enough to hold an ounce of water, sometimes more, sometimes less, according as the hollow is deeper or shallower.

Let not the Student disregard these foramina. He should observe the shallow grooves in the bone that lead to the holes, and reflect upon the comparative security thus given to the nervous cords lying in them, which, in most instances of labor, are by this means protected from injurious pressure by the head of the child or by any instruments used in midwifery.

Pressure upon a nerve gives pain; violent pressure gives rise to intolerable agony, or it inflames or kills the nerve; let him, then, ponder on the possible consequences of pressure and contusion for the limbs that are supplied with nerve-force by means of these sacral bundles.

While speaking of these internal sacral holes for the transmission of nerves, I may seize the occasion to show that the compression of a nerve produces pain, and that the pain is generally intense in the proportion of the violence done to the nerve—short of wholly destroying it.

A child's head can rarely get through the pelvis without compressing, more or less, some one of the nerves in range either on the right or left side of the sacrum. When the head presses upon one of these cords, the muscle or set of muscles innervated by it are thrown into spasm or cramp; whence it is an ordinary occurrence to hear women in labor complain of cramp in the thigh, the leg, &c., which ceases when the pressure is relaxed, and returns again with the effort, until the head having passed down lower than the nerve, the cramp is no longer felt.

I think one of the most fearful instances of human agony that my eyes have ever witnessed, was that of a lady in North Sixth Street, Mrs. Th. S——y, who, being in labor of her first child, and making rapid progress towards a delivery, began suddenly to scream, with the greatest violence, often uttering the words, "Oh, the cramp! the cramp! the cramp!" She was indescribably agitated, her countenance assumed the wildest expression, and all the persons in her chamber became much alarmed on account of the extreme degree of anguish, or rather agony, which was depicted in her countenance and expressed by her shrieks. I had, for many years, been accustomed to the cries of puerperal women, to which I had become very indifferent, but this case deserved to be called terrible. The cramp affected the muscles of her right leg. I explained to her that the cramp was caused by the pressure of the child's head upon one of the right sacral nerves, and, though the appearance of the case was appalling, I exhorted her to bear down, hoping a few vigorous efforts would push the head lower than the point of pressure, and relieve her from the misery. I was disappointed; the cries ceased with the relaxation of the throe, only to return with every renewal of the contraction. So intense was her distress, that she began soon to show signs of exhaustion of nerve-force, and I have now no doubt that she was in imminent danger of death from the excess of pain. The labor was arrested, as to its progress, with every renewal of the labor pains; and it appeared that her whole life-force and perception were occupied with that sole agony. I was three-fourths of a mile from home; and while her husband was gone for my forceps, for which I immediately sent him, she renewed her cries about every four minutes. I think she would have died in half an hour. Upon receiving the instrument, I speedily applied it and drew the head below the compressing point, and she bore the extraction of it without a murmur, for the nerve was set at liberty as soon as I had drawn the head below it. During more than a fortnight after the labor there was a partial paralysis of the limb, following the pinch the nerve had suffered betwixt the fœtal head and the bony pelvis. It did not wholly disappear for many days. Two years later I encountered a similar scene in the same apartment. She seemed to dread nothing in the approaching labor but the "cramp!" and engaged me to be prepared with my forceps, which I unfortunately declined to do. When the head descended into the pelvis, she was seized with precisely the same kind and degree of pain; the forceps were brought to me from the same distance, and she was again as speedily relieved. In this labor, as in the former, a partial paralysis and numbness of the leg followed the parturition, and did not disappear until the month was out.

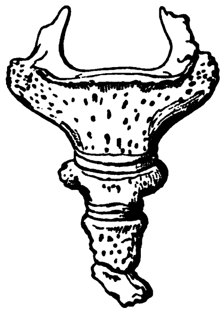
In a third labor, during which I was confined to my house by sickness, she came under the care of my able colleague, Dr. R. M. Huston, well known for his skill as an obstetrician. The same scene was renewed in this third case, and the Doctor felt obliged to relieve her by extracting the head with the forceps. I have attended her in a fourth labor in the year 1846, in which the position of the child was such as to avoid the pressure, and she gave birth to her infant without cramp, or any uncommon pain.

I was in attendance upon a lady living in Turner's Lane, two and a half miles from my house. The labor had proceeded very towardly until the head got well down into the pelvis. I was in a lower parlor conversing with her husband when we were both startled by the sudden, sharp screams of the patient from her chamber in the second story. We both hastened to the apartment, where I recognized a scene in all respects like those witnessed in the accouchement of Mrs. S——y. After vainly exhorting my patient to bear down and push the child lower than the nerve, I engaged Mr. —— to wake his servant, for it was night, and send him on the fastest horse to the city for my forceps. Her agony was indescribable during the whole period of his absence. He had a ride of five miles—out and in. I got the instrument, and the child was delivered within two or three minutes after it was placed in my hands. No evil consequences followed the pressure in this case. She had had several children, but in none of the labors had the nerve got so severe a pinch.

Here, then, are four cases of forceps operations rendered indispensable by pressure on the sacral nerves. I have seen no accounts of similar instances in the books. I have met with many hundred labors in which cramp was more or less violent; but these cases, above mentioned, were really frightful, and I have no doubt that both the distress and the danger were sufficient warrants for the instrumental assistance.

Os Coccygis.—I here present a figure that represents the terminal or caudal extremity of the spinal column, of the natural size. It is called the os coccygis or cuckoo bone, in vulgar language the crupper bone. It consists of three pieces, altogether about an inch and a half long, that are separable in the young, but become anchylosed into one solid piece as advance is made in years. Two styloid processes ascend from the posterior lateral surfaces to rest upon the back part of the apex of the sacrum and prevent the point of the coccyx from being driven too far backwards by the displacing pressure of the fœtus in labor. The cornua, however, are not strong enough always to resist, and they occasionally break off with a loud sound. The sound may be heard at the distance of many feet from the woman in travail. In general, no very great inconvenience is produced by this fracture; although there are met with some instances in which a long-continued pain follows the accident.

Fig. 8.



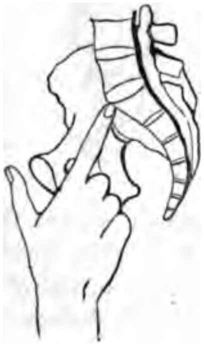
In young women, the articulation of the coccyx and sacrum is a movable one; anchylosis takes place in those who begin to grow old, in advancing beyond the youthful season of bloom and beauty. Hence, it is better that a woman should have her first children before this bony anchylosis takes place, inasmuch as when the sacrum and coccyx have become immovably joined together, the point of the little bone may arrest or distressingly retard the acts of child-birth.

The movableness of the coccyx upon the sacrum is much relied upon as a means of amplifying the antero-posterior diameter of the lower strait of the pelvis; but I do not think that the point of the coccyx usually recedes much during the transit of the fœtal head in parturition.

Most writers attribute to the coccyx a power to recede very considerably. My own observation has led me to regard this recession as less than it is generally admitted to be, and inspection confirms this doubt. The point cannot go very far backwards but at the expense of a fracture of the cornua and of the lesser sacro-sciatic ligaments, which tie it firmly in a certain proximity to the tuberosities of the ischia.

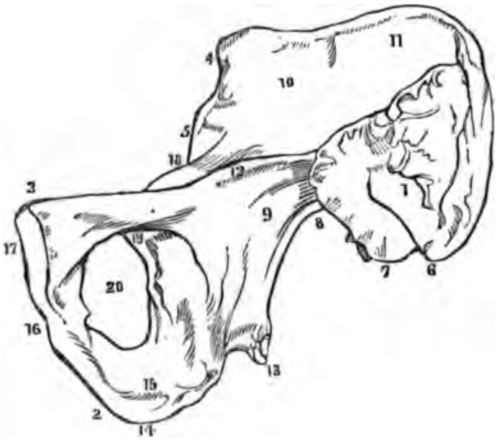
Adjustment of the Sacrum.—The manner in which the sacrum is wedged between the coxalia or hips is worthy of attention. The two auricular facettes converge both downwards and backwards, and are furnished with opposite bulbs and depressions, fitting into each other with the interposed fibro-cartilage before described. This double convergence of the surfaces has the effect of a dovetailing, and prevents the sacrum from slipping down betwixt the hips, when weighed downwards by the weight of the overburdened body, or from being driven backwards by the resistance of the child in labor. The great groove or channel on the back part of the pelvis is almost filled up by means of ligament, so that there can be no stronger joint in the whole skeleton than the sacro-iliac joint.

Fig. 9.



Sacro-Vertebral Angle.—The cut (9) is designed to show the sacro-vertebral angle, which is the point touched by the finger of the hand represented in the figure, and also the shape of the sacral curve: it represents an antero-posterior section of the bone through its middle. In it the base of the sacrum appears to project or advance over the excavation like a promontory. A chord line from the promontory to the point of the coccyx gives a sine of an inch, which is the greatest depth of the hollow. A badly-shaped sacrum causes great difficulty in labor. Whether the curve be too shallow or too deep, it is unfavorable; the figure represents a desirable one.

Fig. 10.



Coxalia.—Having thus given an account of the os sacrum and os coccygis, our attention necessarily turns to the hip-bones, called coxal-bones, nameless-bones, or ossa innominata, which make up the sides and front part of the pelvis. Annexed is a cut (10) that represents the right os innominatum or hip-bone. The very name it bears affords sufficient evidence of the difficulty of describing it in words; I therefore request the reader to refer to the drawing, which affords a very correct notion of the form and arrangement of the several parts of which it consists. It is divided into three parts or pieces, that are named respectively the os pubis, os ischium, and os ilium. The pubis is on the left of the figure, the ischium at the lower part, and the ilium constitutes all the broad portion at the right and superior portion of the cut.

If an os innominatum be taken from a subject under twelve or fourteen years of age, and macerated or boiled in water, it readily separates into three pieces; and the separation takes place because the pieces, in an under age, are not consolidated or become one firm bone. The separation will occur in the acetabular region, where the several pieces are as yet not firmly united by ossific fusion; a union that cannot become complete until the body has acquired such a development as to fit it to undergo the fatigue of gestation, which rarely occurs until the fifteenth year. A bone, taken from the os innominatum of a subject about twelve years old, serves to show the student the propriety of preserving for the adult skeleton the names of the three separate pieces; for he will learn thereupon that it is very convenient to refer to them, in many cases when we desire to direct the attention accurately to a certain point of the pelvis, of which we can then speak, as its ischial, pubic, or iliac portion.

Fig. 11.

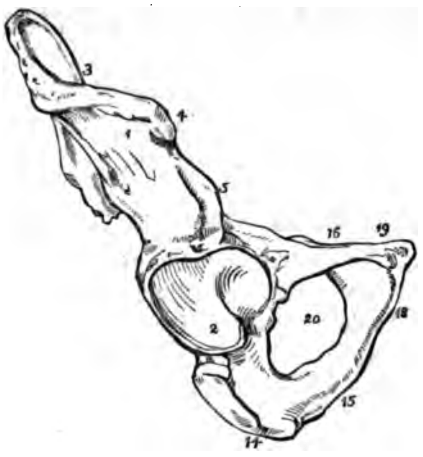


Fig. 11 is a representation of the appearances observable upon the exterior surface of the right os innominatum—1 is the dorsum of the ilium; 2 is the acetabulum; 3, the venter, costa, or fossa; 4, the anterior superior spinous process of the ilium; 5, the anterior inferior spinous process; 14, the tuberosity; 15, the ramus ischii; 18, the descending ramus of the pubis; 19, the symphysis pubis; while 20 is the thyroid foramen, or obturator foramen.

The anterior fifth of the acetabulum belongs to the pubis, the lower two-fifths to the ischium, and the upper and outer two-fifths to the os ilium.

Upon the right inferior portion of the shaded drawing, Fig. 10, is seen the rough surface (7), shaped somewhat like a human ear—whence it is called the auricular surface.

On the left extremity of the figure is another articular facette (17),

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that of the symphysis pubis. The inter-pubic ligament passes from this facette to its fellow on the left os pubis.

The lower part of the picture (14) shows the rough tuberosity of the ischium, sciatic bone or sitting bone, the point upon which the body rests when in a sitting posture.

Just above and behind the tuber ischii is a sharp point, or spinous process (13), which is called the spine of the ischium.

Between the lower end of the auricular facette of the ilium and the posterior extremity of the tuberosity of the ischium, is a deep incisura or notch (8), called the sacro-sciatic notch, because the incisura lies between the sacrum and the ischium. Inasmuch as the ilium also forms a part of the margin of this notch, it would be a better nomenclature to call it the ilio-sacro-sciatic notch; which would fully express the anatomical fact.

This notch is divided into the greater and lesser, and is converted, by means of the sacro-sciatic ligament, in the recent subject, into two large foramina or openings, through which pass certain nerves, vessels, and tendons of internal muscles.

It would be improper, in this cursory examination of the os innominatum, to omit a reference to the smooth or plane surface of the ischium, which is technically called the plane of the ischium. It is all that part of the inner surface of the bone that is bounded by the pubis and ilium above; by the sacro-sciatic notch behind; by the inner lip of the tuberosity below, and the superior part of the obturator foramen in front. It is particularly denominated the inclined plane of the ischium, because the plane, in descending, approaches the plane of its fellow on the opposite side of the excavation.

The Pubis.—The pubis is the smallest bone of the innominatum; it is the *shear*-bone—the bar-bone—the cross-bone—called, in Latin, os pubis, and also os pectinis; from *pecten*, a comb.

As the pudenda is clothed with hair, the term pecten has been applied to that region, and the bone of the pubis has been called the os pectinis. Juvenal speaks of the pecten in *Sat.* vi. 370.

> Inguina traduntur medicis jam pectine nigro.

The pubis is divided into the body, the symphysis, and the ramus.

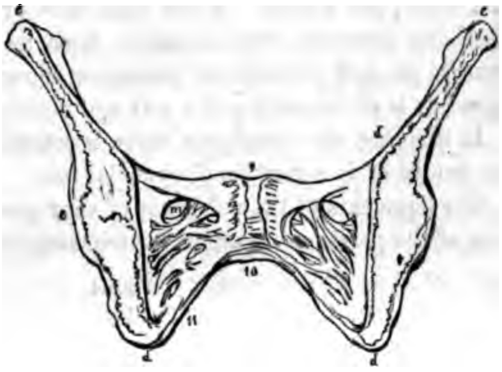
The body of the bone occupies about one-fifth of the structure composing the acetabulum, from whence it extends, the right one towards the left, forwards and downwards, and the left one to the right, forwards and downwards, until the two symmetrical bones meet in the anterior median line of the pelvis at a point called the symphysis pubis, where they are held in strong union by the inter-pubic ligament.

The two symphyseal extremities of the bones are rough, as giving origin to the fibro-cartilage which unites them.

From each symphyseal extremity there descends a thin flattish branch or process, called the ramus of the pubis, which is fused with the ascending ramus of the ischium, both left and right. The divaricating edges of these rami give the form of an arch, which is called the arch of the pubis.

The body of the bone, as has been said, extends itself towards the symphyseal extremity—and that extremity sends down its ramus—so that there is left between the inferior edge of the body, and the interior edges of the ramus of the pubis and ischium, and the anterior edge of the plane of the ischium, a large vacuity, which is the thyroid foramen before mentioned.

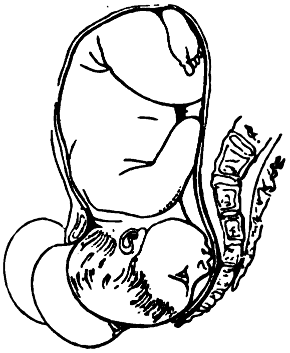
Fig. 12.



The figure gives an idea of the form of the pubis—as to its body, its symphysis, and its ramus—seen from behind looking forwards, or anteriorly.

Let me again advise the student not to despise the strong English word, *bar-bone*, since its meaning is pregnant. This bone is really the bar on which turns the fœtal head in its act of extension; and the word bar-bone is, therefore, a very expressive one.

Fig. 13.



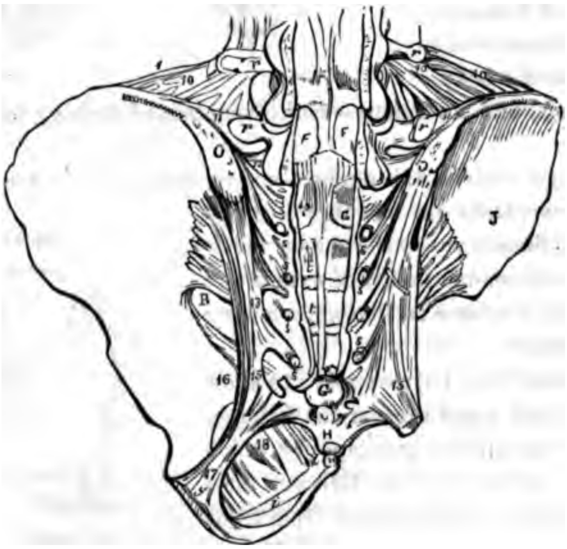
The diagram (Fig. 13) may serve to show a symphysis pubis and sacrum cut through, and exhibiting half the cartilage by which the pubis was joined to its fellow. This symphysis is half an inch thick from front to rear, and an inch and a half high from top to bottom. It is the bar which impedes the progress of the head in front, and which must go under the bar, to get into the world. In doing so, the head revolves beneath the bar-bone, as shown in the figure of the head marked in strong outline, and likewise in the successive positions it assumes (as indicated by the faint outlines), in revolving beneath the bar-bone. When the obstetrician takes the head by force of instruments from behind the bar to bring it into the world, he must do so by drawing it underneath the bar, in the direction shown in the figure.

Symphyseal Ligaments.—The two symphyseal ends of the pubes are, as I said, united by a fibro-cartilage, passing interchangeably from one bone to the other. The lower edge of this ligament is called the triangular ligament. It serves both to strengthen the union and to depress the crown of the pubic arch, which arch is thus made rounder and lower, and elastic. If the head were pressed immediately against the bony structure, that structure, from its inelastic hardness, would contuse the soft parts of the woman or those of the child; whereas the ligament is of the nature of a soft and elastic cushion.

In dividing the symphysis, there is sometimes, not always, found in the centre of it a very small synovial sac.

The ligaments of the pelvis are of very great importance. The firmness of the pelvis as an organ for transmitting the weight of the trunk to the lower extremities, and propagating their motion inversely to the trunk and upper limbs, is dependent upon the ligaments. I shall present

Fig. 14.



the reader here with a view of them taken from a distinguished author, who, I hope, will not object to my exhibiting to the American student a copy of his beautiful drawing. I refer to Dr. Frederick Arnold, from whose *Tabulæ Anatomicæ*, Fasciculus IV. Pars II. *Continens Icones Articulorum et Ligamentorum*, fol. Stuttgard, 1843, I have taken Fig. 14. In this figure the letter G is the sacrum; *s s s* the posterior sacral foramina; H the os coccygis, J the right os innominatum, of which a portion has been removed, O the posterior superior spinous process of the ilium, B the greater sciatic notch; 10 the superior ilio-lumbar ligament; 11 inferior ilio-lumbar ligament; 12 superior sacro-iliac ligament; 13 the posterior superficial sacro-iliac ligament; 15 sacro-sciatic ligament; 16 the sacro-spinous ligament; 17 the sacro-tuberous ligament.

From a mere inspection of Dr. Arnold's figures it is evident that the chief ligamentous strength of the sacro-iliac junction depends, 1st, upon the powerful ligaments on the back part of the pelvis, outside of the excavation; and 2d, on the firm cohesion of the symphysis pubis by means of the strong inter-pubic ligament. The auricular or sacro-iliac cartilage is not represented, and yet it is so strong that I have been much foiled in endeavoring, before my class, to tear open the sacro-iliac joint by pulling asunder the ossa pubis after I had performed the section of the pubic ligaments: the origin or insertion of the auricular cartilage must be torn out from the bone before it will yield, for the fibres will not break. They can only be torn out by the roots.

Opening of the Joints.—Many people among the mass of society suppose that in every labor, the joints become relaxed, in order to let the child pass through the bones; and a good many ladies daily take a spoonful of oil of olives or castor oil, with a view to promote this desirable relaxation, as they esteem it to be. I have known a young thing take the trouble, nightly, to anoint the mons veneris for a long period with lily ointment, to soften the joint.

It is understood, however, by the anatomist, that these joints do not become open and relaxed as a normal effect of gestation, of labor, or of any endermic or therapeutical measures, resorted to for that end. Yet they do, in some persons, relax, to their great injury or inconvenience, and cases of this kind are recorded in the books, and will be met with by most persons extensively engaged in the practice of midwifery.

As to the symphysis pubis, I have on many occasions found it to be quite loosened, and admitting of motion. One of my patients, whom I have succored in many of her confinements, has generally suffered from the relaxation of the symphysis pubis during the several last weeks of her pregnancies. The articulation becomes so loose as to make a very considerable cracking sound, whenever she would turn in bed, or walk; and she has been good enough, in order that I might verify the fact, to allow me to cause the motion by pressing with my hands on the opposite spinous processes of the iliac bones, by which means I could cause the two opposite pubes to approach or separate from each other, or ride up and down, passing each other in the direction of the length of the symphysis.

When the patient, in such a state of the inter-pubal ligament, stands on the right foot, the right pubis rises upwards, while the left descends, and *vice versâ*—so that the act of walking is not only attended with pain, but with tottering and uncertainty.

The lady in question gives birth to children weighing ten and twelve pounds, but she has commonly recovered from the relaxation within about forty days after the birth of the child, and her pubic joint then remains perfectly strong and efficient, until in an advanced stage of the next gestation, the pressure and the infiltration come to loosen and dispart the bones again.

This lady has been fourteen times pregnant, and has given birth to twelve children at term. The joint did not give way until the sixth accouchement, which occurred Oct. 20th, 1833. The child weighed upwards of twelve pounds. The motion of the symphysis was very obvious, and quite painful. She recovered from it, however, and did not feel it again until near the close of a pregnancy, which was concluded on the 12th December 1835, by the birth of a son. In about a month the articulation was again as firm as ever. A daughter was born October 30th, 1837, which reproduced the relaxation. She soon got over this, and in the next pregnancy and confinement felt nothing of it. This labor was on the 2d of September 1843. When the child was three months old, the relaxation took place, and was long troublesome. She was again pregnant in 1845, but had no return of the inconvenience in the gestation or lying-in, which occurred January 20th, 1846. The joint gave way again soon after her last accouchement, Aug. 17th, 1847; she discovered it on the 20th day of the month, and it is so movable, that a cracking sound is produced by turning in bed.

The Student will readily perceive that a considerable relaxation of the pubal joint cannot fail to coincide with a relaxation, more or less considerable, of at least one of the sacro-iliac junctions, and that in such case the pain, weakness, or constitutional disturbances developed by the accident are readily accounted for, and can be treated wisely at least, if not fortunately. It appears to me that in articular maladies or accidents of the sort there is but one sound principle of cure, and that one consists in the prescription of absolute rest for the diseased or injured textures.

It can hardly be expected that a woman will get well under these circumstances while walking about; nor is it to be doubted that she would recover if the articulation should be kept for a long time in absolute repose.

Having now described with sufficient detail the several constituent bones of the pelvis, it is proper to take a view of that structure, as a whole, which deserves to be regarded somewhat in the light of a great and important organ of parturition.

The Whole Pelvis.—The female pelvis is divided into two portions, two cavities, two basins, or two pelves, one of which is the upper, and the other the lower; or the greater, the lesser; the superior, the inferior, which last is the pelvis, the true pelvis or excavation, or cavity.

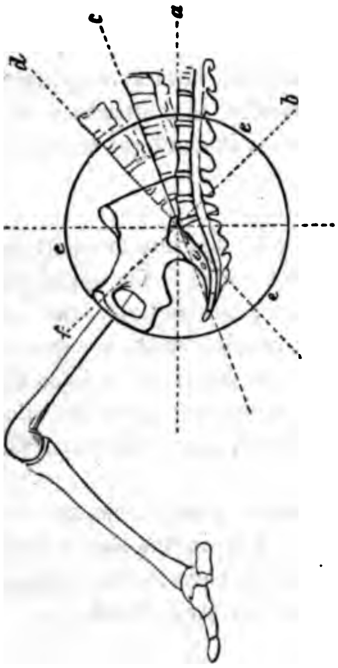
The division betwixt the two portions is to be found at the linea ilio-pectinea; for the whole pelvic cavity is, in a sense, worthy to be called, as it often indeed is called, a canal, a bony canal, the pelvic canal with its upper and lower straits.

The strait betwixt the upper and lower pelvis is called the superior strait; and it is a strait because above it is the great, the larger basin, and below it is the smaller or lesser basin, which, nevertheless, is a part where the pelvis is more spacious than it is at the strait itself.

Plane of the Superior Strait.—The plane of the strait is an imaginary superficies, the anterior margin of which is at the symphysis pubis, its posterior margin at the promontory, while the rest of its margin touches the inner lips of the linea ilio-pectinea.

Inclination of the Plane.—When the woman stands erect, or lies at length on the back, the plane of this strait dips at an angle of 50° below the conjugate diameter. It must clearly appear that the plane of the superior strait dips at a variable angle in various positions of the trunk of the body: for, if the subject be standing, it dips as above at 50°; but if the trunk be inclined forwards, the dip will be lessened; or if the trunk be inclined far backwards, it may be increased. Now this is an important item of obstetric knowledge, since upon it is founded our advice as to the decubitus of the patient, whom we may direct to extend her trunk or to flex it more or less, as we may or may not desire to bring the plane or the superior strait into a position that may favor both the entrance of the presenting part into the strait, and its passage through it.

Fig. 15.



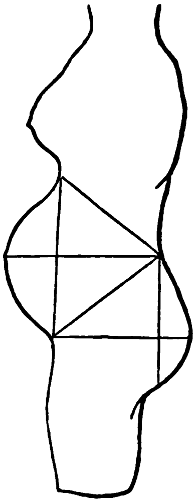
The figure is designed to show that the plane of the strait may give different angles with the spine, according as the spine is brought more forward, or carried farther backwards over the opening. Thus *e e e* is a circle of which the diameter *b f* represents the inclination of the plane of the upper strait, equal to an angle of 135° *f a*, which is the ordinary attitude of the spinal column or axis of the trunk. If the patient lying upon her back should have her shoulders raised, so as to carry the spine forward to *c*, equal to 22.30°, the angle would be reduced to 112.30°. But if the shoulders should be still more elevated to *d*, the axis of the trunk would be at right angles to the plane of the strait *b f*.

The same effect as to the inclination of the plane of the strait is produced in the patient, lying on her side, whenever she bends her head and trunk forwards; and, indeed, in labors, we constantly see women prompted by an instinctive sense of the utility of it, bending the trunk quite over the abdominal strait, to which, moreover, the old nurses and experienced crones urgently exhort them. A child's head, that in one inclination of the plane should be driven against the symphysis pubis, would with a lesser inclination of it plunge at once to the bottom of the pelvis.

Justus Heinrich Wigand, the lamented author of the celebrated volume entitled *Die Geburt des Menschen*, was deeply impressed with the importance of a careful attention to the inclination of the plane, in labors. He often made use of his knowledge of it as a foundation of his prognosis. I have copied the following outline figures from the second edition of his work by Froriep. They represent the female torso in profile. Each figure has marked upon it six lines, of which the two horizontal ones extend parallel to each other, from the promontory of the sacrum and the symphysis pubis respectively.

In a well-formed pregnant female, the profile will resemble the outline of Fig. 16, provided the child be not very large, nor the liquor of the amnios excessive in quantity. As in Fig. 16 the back bone will not be excessively curved, a line drawn horizontally forwards from the top of the sacrum will pass out exactly at the navel; and equal angles will be formed by a line drawn from the top of the sacrum to the symphysis pubis, a line which indicates the inclination of the superior strait, and one drawn from the same point to the scrobiculus cordis. A line from the scrobiculus cordis to the symphysis pubis will be perpendicular to the one first mentioned.

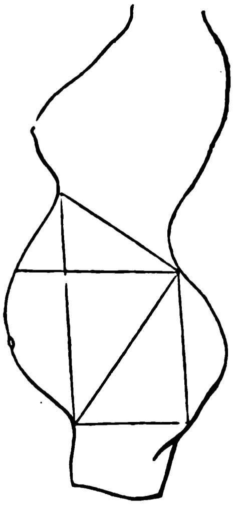
Fig. 16.



To observe in a person such a figure might well serve to establish a favorable prognosis; since, *cæteris paribus*, any untoward circumstances would be very little to be expected with so perfect a form, proportion, and arrangement of parts.

Fig. 17 is a copy of Wigand's figure 3d, in which he proposed to represent the profile of a pregnant woman of apparently perfect form, but in whom the inclination of the superior strait is excessive, as may be seen by observing the line drawn from the top of the sacrum to the top of the symphysis pubis. In such a patient the plane of the strait looks almost vertical, and the indication of course would be to cause her to bend herself strongly forwards, flexing the thighs very much upon the pelvis. Such a direction alone might suffice to correct the excessive inclination of the plane, whereas, if she should lie on the back with the shoulders low, and the limbs extended, the presenting part could hardly fail to be driven upon the top of the ossa pubis. In this figure the back is much more curved than in the former one. The horizontal line, from the base of the sacrum to the abdomen, is far above the navel, and the uper triangle or that of the scrobicle is much smaller than that of the pubis. The line falling from the scrobicle to the pubis inclines backwards, whereas in the former figure it is perpendicular. In this figure, the perpendicular line from the base of the sacrum is far in

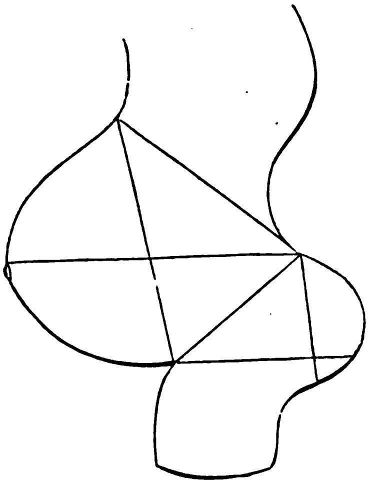
Fig. 17.



advance of the upper dorsal vertebræ. The contemplation of these ingenious profiles of the admirable German cannot fail to increase the tact and knowledge of the Student, to whom the study of them is warmly recommended.

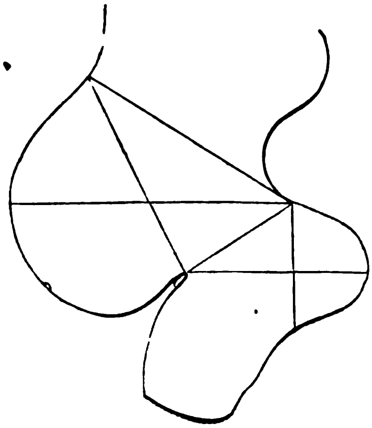
Here is Wigand's fig. 4, which is the profile of a woman with a pelvis so deformed as to imply a necessity for the operation of perforation, on account of its vitiated conjugate diameter. The angle formed by the back part of the sacrum and spinal column is much too small. The bend is quite different from the gentle curve seen in the first profile. The scrobicle projects very much over beyond the symphysis pubis, as by the line uniting them may be seen. The horizontal line from the base of the sacrum comes out just above the navel. The line from the scrobicle to the base of the sacrum, and that from the sacrum to the pubis, are not equal, as in the first and more perfect figure. The chord line from the promontory to the coccyx inclines backwards, and the whole of it is in rear of the upper part of the spinal column.

Fig. 18.



Wigand's 5th figure represents a pregnant woman, the conjugate diameter of whose superior strait does not exceed one inch or one inch and a half; and which, according to most of the German accoucheurs, indicates a resort to the Cæsarian operation.

Fig. 19.

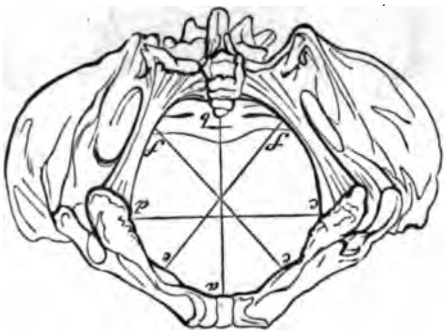


The belly is quite pendulous over the pudenda. The plane of the strait makes a very sharp angle with the horizontal line, which comes out high above the umbilicus. The back is extremely hollow, in consequence of the sinking of the sacral promontory down towards the pubis, and the line from the scrobiculus cordis to the ossa pubis retreats strongly in a backward direction, leaving the breast to hang far over the pudenda in front. The curve of the sacrum is sharp, and the compensating curvature of the upper part of the vertebral column is highly characteristic of this malformed pelvis, and is of an evil omen for the unfortunate woman.

Such are some of Wigand's outline figures. I believe that a view of them will be very useful to the Student, though it takes many years of practice, and a great clinical experience and close observation like Wigand's, to enable one to become possessed, at a glance, of the peculiarities of the case. He, however, was a *Master* in our art, a man who devoted his time to its improvement, and spent the last moments of his truly missionary life in laboring to complete the beautiful volume from which I have taken his drawings. It is a privilege and an honor to evoke such a man from his too early grave, in order that he, though dead, may yet speak in this distant land.

Plane of the Inferior Strait.—The plane of the inferior strait is usually regarded as bounded by the inner lips of the two tuberosities of the ischial bones, the rami of the ischia and pubis, the ischio-sacral ligaments, and the point of the coccyx. In this way we speak of the plane of the inferior strait as one plane only; whereas, there are in fact two such planes; an anterior and a posterior.

Fig. 20.



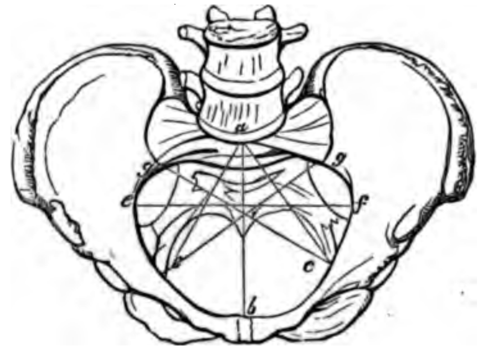
This figure exhibits the contour of the outlet. The line *c d* represents the transverse diameter. The letters *c e a e d* show the anterior semi-circumference, while *c f b f d* show the posterior semi-circumference of the outlet. Now from *c d* to *a* is an inclined plane, and from *c d* to *b* is another inclined plane. These planes intersect each other at an angle of 140°, and they ought to be distinguished as the anterior and as the posterior inclined planes of the perineal strait.

In midwifery, it will be found that, as the child descends, in order to escape from the womb, it first impinges upon the anterior portion of the posterior inclined plane, which it depresses first, and then begins to depress the posterior edge of the anterior inclined plane. When it has succeeded in depressing the edges of the two planes, it escapes betwixt them, whereupon they resume their place like two valves, whose floating margins had been first widely separated, and then allowed to close again.

Diameters of the Pelvis.—The diameters of the pelvis are certain imaginary lines extending across the pelvic canal in different directions, but having reference, in the books, chiefly to the mensuration of the straits or narrowest parts of the pelvis.

For the superior strait there are assigned four diameters, which are, 1st, the antero-posterior; 2d, the transverse; 3d, the right; and 4th, the left oblique diameters.

Fig. 21.



In the figure, *a b* is the antero-posterior diameter, which extends from the symphysis pubis to the promontory of the sacrum; *e f* is the transverse, while *g c* and *g c* trace out the places of the right and left oblique diameters, as they pass diagonally from each sacro-iliac junction to each acetabulum. The lines *a c* and *a c* measure the distance from the sacrum to the right and left acetabular regions of the pelvis.

In the inferior strait, Fig. 20, are reckoned two diameters: 1st, the antero-posterior, and 2d, the transverse diameter. The knowledge of these diameters is of great importance in the scientific management of labors, on account of their relation and comparison to parts of the child, as presenting naturally, or as abnormally presented or placed.

I have made many careful measurements of the fœtal head, and those measurements were reported to the meeting, held at Philadelphia, for celebrating the one-hundredth anniversary of the American Philosophical Society, on the 25th day of May, 1843.

The mean magnitude of the child's head at term, according to the statements made in that paper, is greater than that stated in our books; for, of 300 heads measured with the calliper immediately after the birth of the child, there were forty heads whose smallest diameter was four inches or more than four inches in length; while only one head was less than three inches and a half, the usually supposed mean length of the transverse diameter. Now, the great interest we take in the measurement of the pelvis relates to a due proportion between the pelvis and the child that is transmitted through its canal; but, if the child's head is 3.8 inches in its smallest diameter, the dried pelvis ought to be more than four inches in its smallest diameter in order to allow for it a free transit.

I measured ten dry pelves, among those in my collection, and the results, as to the diameters of the upper and the lower straits, were as follows in the table which I subjoin:—

	Superior Strait.			Inferior Strait.	
No. of Pelves.	Antero-Posterior.	Transverse.	Oblique.	Antero-Posterior.	Transverse.
1	4.2	6.	5.3	4.	4.3
2	4.4	5.5	5.5	3.6	4.4
3	3.9	4.8	4.7	2.7	4.2
4	3.5	5.	5.	2.9	4.3
5	4.2	5.	4.8	3.1	4.6
6	4.3	4.6	5.5	4.1	4.6
7	4.9	4.7	4.8	4.1	4.1
8	4.3	4.5	4.3	4.1	3.8
9	4.4	4.8	4.9	3.6	4.7
10	4.3	4.8	4.7	3.8	4.2

The mean in these ten dry pelves for the superior strait was 4.2 for the antero-posterior diameter; for the transverse diameter, 5.1; and for the oblique diameter, 4.9. For the inferior strait, the mean of the antero-posterior diameter was 3.7; and for the transverse diameter, 4.3. But it should be observed that the point of the coccyx is always drawn forwards by the shrinking of the sacro-sciatic ligaments in drying; whence, the line of 3.7 is not expressive of the truth as it is in the living woman.

I here present a tabular statement of the dimensions of the pelvis taken out of several authors, in order that the American student may readily collate their opinions, and so come to the conclusion that these dimensions are not a fixed, but a variable quantity; and that, as one woman is taller or shorter than another, or has a larger foot, hand, nose, or chin than another, so she may have a pelvis adapted to her own special proportions, or a pelvis of four inches to four and a half inches in its antero-posterior diameter.

	Superior Strait.			Inferior Strait.	
	Antero-posterior.	Oblique.	Transverse.	Antero-posterior.	Transverse.
Smellie	4¼	—	5¼	4¼	—5
Denman	+4		+5	+5	+4
Burns	4	5⅛	5¼	5	4½
Ashwell	4	5¼	5	5	4
Churchill					
Baudelocque	4	4½	5	4	4
Gardien	4	4½	5	4	4
Velpeau	4	4½	5	4	4
Boivin	4	4½	—5	4	5
Chailly	4	4½	5	4	4
Carus	4	4½	5	3½+4½	4
Capuron	4	4½	5	4½	4
Dewees	+4	+5	+5	+4	—5

It would be well, I think, for the student to regard the diameters of the superior strait as presenting an average capacity, as in the following statements:—

1st, 4 inches for the antero-posterior diameter.
2d, 4½ " " transverse diameter.
3d, 5 " " oblique diameter.

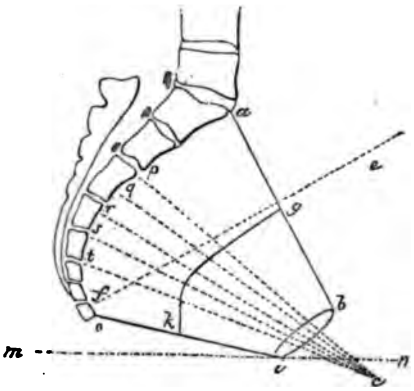
This would be sufficiently accurate for all general purposes, and is easily remembered. It accords well enough with the known diameters of the head.

As to the inferior strait, let him state the antero-posterior diameter as 4½, and the transverse diameter as 4; this will give abundant space for the extrusion of the head, while undergoing the act of extension after rotation.

Axis of the Pelvis.—The inclination of the plane of the superior strait is so great that the axis of that plane, if produced in a downward direction, would fall upon the sacrum a short distance above the apex of the bone. The axis of the superior strait can never, therefore, represent the axis of the pelvis.

The axis of the inferior strait, which is a line falling perpendicularly upon the so-called plane of the inferior strait, midway from the pubis to the coccyx, could not represent the axis of the excavation. The antero-posterior diameter of the superior strait and that of the inferior strait approach each other at an inclination which causes them to decussate at only a short distance in front of the pubis, as in the figure, in which *a b* represents the plane of the superior strait, and *o i* represents that of the inferior strait. If these lines should be produced in front, they would intersect each other at the distance of an inch or less at *c*. But the lines *p c*, *q c*, *r c*, *s c*, and *t c*, also represent antero-posterior diameters of the pelvis, or planes of the pelvis, and each one of those planes has an axis, which is a line perpendicular to the centre of the said plane, so that the axis of the pelvis consists of the axes of the successive planes passed through in descending from the top to the bottom of the excavation. The line *e f* and the line *g k* respectively represent the axis of the superior and that of the inferior strait.

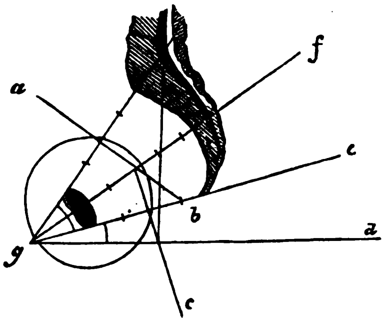
Fig. 22.



Carus's Curve.—A far preferable method of describing and understanding the axis of the pelvis is that proposed by Dr. Carl. Gustav. Carus, Prof. of Midwifery in the Medico-Chir. Acad. of Dresden. His views are stated in his *Lehrbuch der Gynækologie*, etc., Part I. p. 33, § 44.

Professor Carus directs that one leg of a pair of compasses should be set in the middle of the posterior edge of the symphysis pubis of a bisected pelvis, as in the figure, which I have copied from his plate—the other leg of the compass being opened two and a quarter inches—I propose two inches only, which is half the antero-posterior diameter of the pelvis. A circle may now be drawn downwards, commencing at the plane of the superior strait, and continued through *g f*, *g e*, and *g a* to the point of departure. This is Carus's circle, a segment of which represents, within the excavation, the axis of the pelvis. This curve of Carus is the bent axis of the pelvis, and it is an imaginary curved line, in coincidence with which, the centre of the fœtal encephalon moves as it passes from the upper pelvis through the excavation, the inferior strait, and the produced genital aperture, in the act of being

Fig. 23.



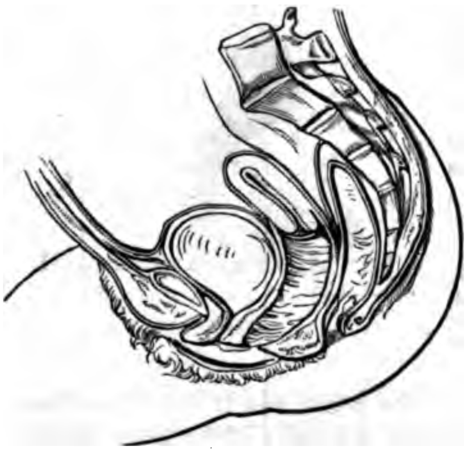
born. If the head of the child in a labor should continue to move, after its birth, in the same curve it moved in while within the pelvis, the head would come back to the point of departure at the centre of the plane of the superior strait. The line *a a* is the axis of the plane of the superior strait, and the line *c* is that of the plane of the inferior strait.

Such is Carus's curve, which is the bent axis of the pelvic canal—an important item of midwifery knowledge; one without which a practitioner is incompetent scientifically to deliver a placenta, and far less to extract a child by turning, or to apply and deliver with the forceps or the crotchet. I caution the Student not to fail in understanding this point very perfectly. If he should make himself perfectly familiar with this curve of Carus, I see not how he could make any mistake as to the appropriate direction of his efforts in any act of delivery, whether with the hand alone, or with instruments.

The straits, diameters, planes, axes, and curves of the pelvis are related, in an obstetrical regard, to a certain form, magnitude, and position of the presenting part of the child, which, in its passage through the pelvis, performs certain movements that are spoken of as the mechanism of the labor, and which I shall proceed to explain after I shall have first spoken of the recent pelvis, and of the child in utero.

The Recent Pelvis.—The figure (Fig. 24) represents a cross section of the recent pelvis. In it is seen the sacrum covered posteriorly with the integuments and muscles. The rectum lies in front of the sacrum, and a segment of the gut has been removed in making the cross section, because the intestine descends to the left of the median line of the sacral curve.

Fig. 24.



In front of the rectum is the canal of the vagina, upon the top of which is seen the womb whose fundus inclines forwards, while the cervix looks in a direction backwards and downwards. The womb rests upon the vagina, which is kept extended by means of its connection to the rectum behind, and to the urethra and bladder of urine in front, and by no other powers. If the vagina should become shorter, the womb would be situated lower down in the pelvis: if the vagina should become longer, the womb would rise higher. The length of the vagina determines the height of the uterus, or its distance from the ostium vaginæ.

In front of the vagina and womb, is the bladder of urine, with its canal or outlet, the urethra. The bladder lies behind the symphysis of the pubis, to which it is attached. The urethra comes out just under the bottom of the symphysis.

The bladder is covered, at its summit, with the peritoneal membrane, which descends a short distance on its posterior wall or bas-fond, and then, turning upwards on the anterior face of the womb, passes over its top, and thence descends upon its posterior surface, from whence it continues downwards upon the back wall of the vagina. It descends one-third of the distance from the top to the bottom of the vagina, and then mounting upwards again upon the rectum, passes above the plane of the superior strait, to give a serous coat to the visceral contents of the belly.

Let the Student note the fact that the peritoneum does not descend more than half way from the top to the bottom of the front surface of this womb—and, therefore, that the front wall of the vagina has no relation whatever to the peritoneum; whereas, the upper third of its posterior wall is clothed with a peritoneal coat. An instrument thrust through the upper part of the vagina, in a direction forwards, would wound the bladder; whereas, one forced through the upper part of the vagina, in a direction backwards, would pass into the peritoneal sac. This is the weakest part of the vagina, and, therefore, most liable to laceration or rupture in labors. It is the part most in danger from obstetric instruments.

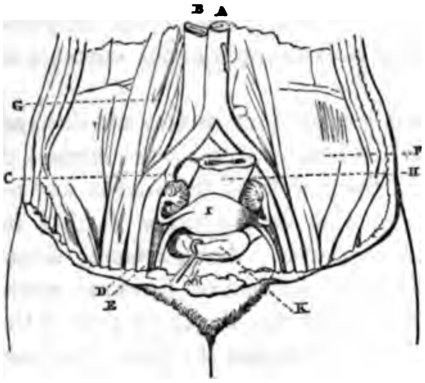
The sides of the vagina are related to the spaces included betwixt the peritoneal folds of the broad ligaments. Wounds and punctures, extending from it sideways or towards the ischial planes, would pass into the laminated and very loose cellular tela that exists in the interstices of the said ligaments.

The pelvis contains also the levatores ani muscles, which descend, like the converging rays of a fan, one at each side, and are so inserted as to lift the perineum, and consequently all the movable contents of the pelvis, up *towards* the superior strait. The stronger the levators, the deeper is the sulcus betwixt the nates; and in general, the better sustained are the contents of the basin. In the young and vigorous, the sulcus is deep; in the aged and feeble, it descends lower and lower, so that, in very old and exhausted persons, the perineum becomes actually protuberant or convex.

Within the recent pelvis are numerous blood-vessels and nerves, supplying the contained organs, besides large bundles of nerves that come from the sacral foramina and soon leave the cavity, passing outwards through the ischiatic notches to form the great sciatic nerve.

Here also are contained the ureters; while overhanging the brim are seen the psoas muscles, which seem to lessen the transverse diameter of the upper strait. Let the student be particular to note the place and appearance of the psoas muscles, as they pass along the brim of the pelvis; and let him observe that, when a woman, who has recently been delivered, suffers from inflammation of the womb, she always experiences pain when she draws up the knees, because the overhanging bellies of the psoas muscles, in contracting to flex the thighs, press very painfully upon the inflamed globe of the uterus, which still juts up above the plane of the superior strait, filling up the whole of its transverse diameter.

Fig. 25.



The figure may give some idea of the relation of parts in the recent pelvis. A is the aorta, and B the vena cava; C the internal iliac artery descending into the pelvic excavation; D and F are the external iliac artery and vein; F G the psoas muscles, H the rectum, I the womb, and K the bladder of urine.

CHAPTER II.

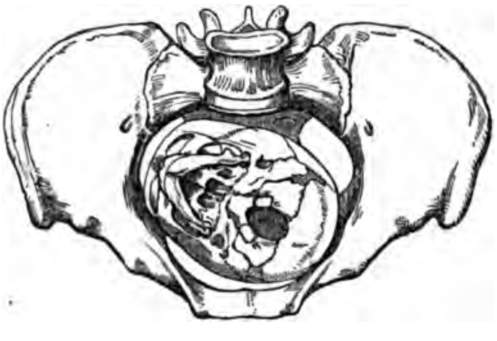
MECHANISM OF THE PELVIS.—OF THE MECHANISM OF LABOR AS IT DEPENDS UPON THE RELATIONS OF THE PELVIS AND THE FŒTAL HEAD.

Before I leave off speaking of the nature of the pelvis, I am to treat of what is usually called its mechanism, as dependent upon certain forms of the pelvis; and the relations of the child and its position to those forms.

Flexion, and Obliquity of the Head.—In head presentations, the occipito-mental diameter dips its occipital pole, and it generally assumes a direction that is oblique as to the plane of the superior strait, which it crosses diagonally.

I say diagonally, for, although it be true that a child may descend through the plane in a direct position, *i. e.* with its vertex, or its forehead to the pubis, such direct positions are rarely to be met with; and clinical experience shows that, in the immense majority, the head sinks below the plane with the occipito-frontal diameter coincident with the oblique diameter of the upper strait, as in Figure 26.

Fig. 26.



The fœtal head usually descends through the plane of the abdominal strait in flexion, *i. e.* with the chin to the breast, the vertex being turned towards the left acetabulum, while the bregma, or upper part of the forehead, points towards the right sacro-iliac symphysis: *vid.* Fig. 26. The occipito-frontal diameter is probably nearly coincident with the plane of the strait in the beginning of most labors, whence it appears that the occipito-mental diameter must dip its occipital extremity beneath the plane.

In proportion as the presenting part descends lower and lower, the dip of the occipital pole of the occipito-mental diameter increases. It must be so, since the occipito-frontal diameter could not descend horizontally into a pelvis too narrow for it. That diameter which, by my averages, is 4.10, could not, without a dip or see-saw, sink into the lower part of a pelvis whose transverse diameter, low down in the excavation, does not considerably exceed four inches.

The deeper the head plunges into the cavity, the more strongly is the chin forced against the breast, or, in equivalent terms, the greater the flexion of the head.

Rotation.—As the pains force the head lower and lower, the vertex is driven into strong contact with the plane, smooth, inner surface of the left ischium, which constitutes the left antero-lateral wall of the excavation. This plane of the ischium, which is inclined towards its opposite fellow, in both a forward and downward direction, repels the vertex that is pressed upon it, and the double inclination of the left plane serves to compel the vertex to slide downwards, forwards, and inwards, towards the pubal arch. It naturally turns towards the arch, because there is little to hinder its moving in that direction, save the soft parts, which offer a resistance whose force can by no means be compared to the resistance of the solid bony wall that repels or repercusses it.

While little resistance is presented in the direction of the arch, or outlet, there is likewise very little to oppose the tendency of the face and forehead readily to slide into the hollow of the sacrum, that seems to gape to receive them.

Under this view, there can be no doubt that the inclined plane of the ischium is the principal cause of the conversion of the oblique into an antero-posterior position, which the head acquires when it reaches the lower part of the excavation. The inclined plane, therefore, is the chief cause of the rotation of the head.

Thus, the head turns on its axis as it descends. It abandons the oblique attitude in which it engaged in the strait. Having reached the bottom, its occipito-frontal diameter coincides with the antero-posterior diameter of the pelvis, and the head is, therefore, found to be rotated.

It was oblique, and in flexion. It has lost its obliquity, but still preserves its flexion at the bottom of the excavation—the vertex pressing against the posterior margin of the crown of the pubal arch. The occipito-frontal diameter has turned one-eighth of a circle, from the acetabulum to the symphysis pubis.

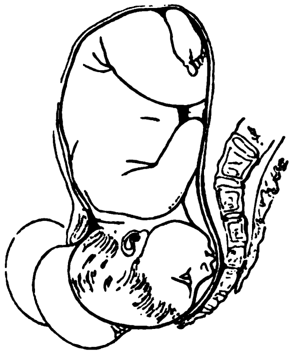
This is rotation, a term much used in midwifery.

Extension.—The rotation of the head being now completed, by the arrival of the vertex at the symphysis, the crown at the bottom of the pelvis, and the face in the hollow of the sacrum, the head being still in flexion, the next, or third act of mechanism begins to be performed: I mean the extension of the head, or the departure of the chin from the breast.

If the whole perineum could be cut away with a bistoury, I could suppose the child's head might come forth from the lower strait without any extension, and with the chin still at the breast; but the pains now thrust the sagittal suture, in its whole length, indeed the entire crown of the head, against the elastic resisting perineum and posterior vaginal wall. The efforts, being often repeated, serve to push the perineum away from the crown of the pubal arch to let the vertex escape under it; but, while the perineum is pushed off by this force, the same perineum jams the occipital bone of the child firmly against the crown of the arch; so that, as the vertex emerges from the genital orifice, the os occipitis is pressed close to the symphysis, first at its lower edge, and next on its outer or front aspect. The cranium of the child is born as soon as the extension is complete, but not until then.

Figure 27 exhibits the manner in which the vertex touches the inner surface of the crown of the arch when the rotation is complete. The faint lines show how it rolls out under the edge of the triangular ligament, and also how it next rises upwards in front of the outer surface of the symphysis, the head turning over backwards as it emerges.

Fig. 27.



Restitution.—As soon as the head is born, it begins to rotate back again, outside of the pelvis, to the same point or direction it had upon first engaging within the pelvis. Its originally oblique position becomes restored, and this, which is the last act of mechanism, as to the head, is called the restitution.

Mechanism of the Shoulders' Delivery.—The cause of restitution is to be sought for in the state or position of the shoulders.

When the vertex is at the left acetabulum, the right shoulder is at the right acetabulum, and the left one at the left sacro-iliac synchondrosis. But the inclined plane of the right ischium repels the descending right shoulder, pushing or sliding it downwards, forwards, and to the left, until it comes to the symphysis pubis. The left shoulder meanwhile falls into the open chasm of the hollow of the sacrum that yawns to receive it freely.

This rotation of the shoulders, or, in other words, rotation of the trunk of the body, causes the act of restitution of the head, which, being already born, must turn coincidently with the rotation of the shoulders.

Such is the act, or rather such is the succession of acts, commonly called the mechanism of the head, in a labor in which the vertex presents in the first position. I shall now recapitulate them as predicated of a vertex presentation in the first position.

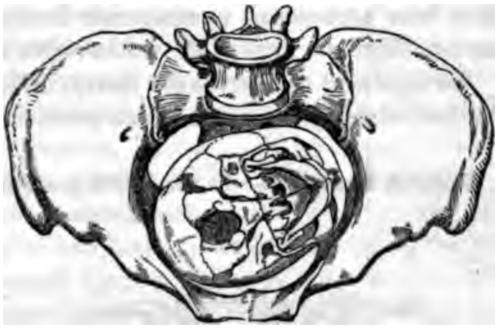
1. FLEXION.—The head becomes flexed; the chin going to the breast. It enters the pelvis obliquely, with the vertex to the left acetabulum.
2. ROTATION takes place as it descends, because of the repelling resistance of the plane of the left ischium, the lessened resistance under the arch, and the incurvation or hollow of the sacrum.
3. EXTENSION commences under the upward pressure of the perineum, and continues to increase until the child is born.
4. RESTITUTION allows the vertex to seek its original oblique direction, as it goes back again towards the left acetabulum.

In treating of labors, and the conduct of them, I shall have numerous occasions to refer to, and further explain, the mechanism of the delivery of the fœtal head.

Mechanism of the Pelvis, with Vertex in Second Position.—In this labor the vertex is at the right acetabulum. In saying that the vertex is at the right acetabulum, it is not intended to convey the idea that the posterior fontanelle is always directed absolutely against the acetabular region. Experience will soon teach even a young practitioner, that the child retains in early stages of labor the ability to rotate its head right or left, and that it generally exercises this faculty very freely, spinning its head upon the cervical spine so as to turn the vertex sometimes quite close to the symphysis pubis, and then whirling it back to the top of the ischium, or even as far backwards as the ilio-sacral junction. As the cranium, however, plunges deeper and deeper into the excavation, it becomes so tightly held that these sudden motions cease, and it only moves in the direction impressed upon it by the mechanics of the pelvis.

The processes by which the vertex in a labor of the second position, as in Figure 28, is brought forth, are the converse of those I have described as taking place in cases of first position. The flexion is followed by the rotation as the head sinks low into the cavity; the vertex being repelled towards the left by the inclined plane of the right ischium.

Fig. 28.



As soon as the posterior part of the summit of the head reaches the perineum, the perineum, while it yields before the descending power, thrusts the occiput firmly upwards against the crown of the pubal arch, as in the first position. The extension or reversion of the head being completed by its expulsion, restitution then takes place by carrying the vertex to the right acetabulum, outside, and the face to the left thigh. The left shoulder turns to the right and forward to get under the arch, while the right shoulder goes to the sacrum, and so the shoulders are delivered; sometimes the pubal shoulder is the first, and sometimes the sacral one is the first to be expelled.

Third Position.—The mechanism of the head, when the vertex presents in the third position, differs from the two just before described, only in the absence of the second act, the act of rotation.

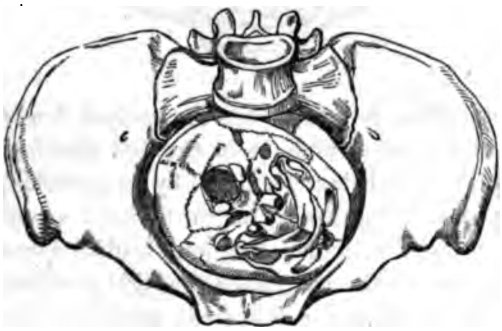
These third positions are very rarely observed; and it is probable that when they are met with, they depend upon a peculiar form of the superior strait.

I possess some pelves in which the antero-posterior diameter of the superior strait greatly exceeds the length of the transverse or oblique diameters. In such a pelvis it is obvious that the vertex would be more likely to present itself at the pubis, than at either acetabulum. In an ordinary conformation of the superior strait, a third position of the vertex presentation is extremely unlikely to occur, since long before the commencement of the labor, the prominence of the lumbar vertebræ, and the overhanging promontory of the sacrum, would be almost sure to turn off the rounded forehead of the child into the right or left sacro-iliac region; and this the more probably, inasmuch as the oblique being greater than the antero-posterior diameter, it affords an easy and inviting accommodation to the usual oblique mode of engagement. The three positions that have here been spoken of comprise the occipito-anterior positions of the vertex. They are those I have been accustomed to enumerate in the following order, viz., first, second, third, or, vertex-left, vertex-right, and vertex-front positions.

We have next to describe the fourth, fifth, and sixth; or forehead-left, forehead-right, and forehead-front positions of the vertex presentation.

Fourth Position.—In the fourth position, the occipito-frontal diameter crosses the pelvis obliquely, as it does in the first position, with this difference, that its frontal extremity is at the left acetabulum, and its occipital pole at the right sacro-iliac junction. See Figure 29.

Fig. 29.

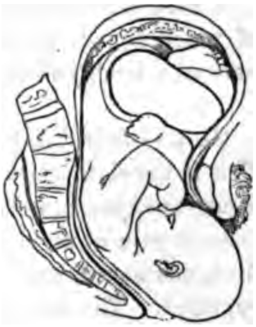


This is a true vertex presentation; and it must not be mistaken for a presentation of the forehead. It is a true vertex presentation, because the chin is close to the breast, and there is no departure; on the contrary, the flexion is, perhaps, even stronger than in occipito-anterior positions.

The mechanical form of the pelvis is so miraculously adapted to the wants of the economy in labor, that it has power, in a major part of these fourth positions, to rotate the vertex from the right sacro-iliac junction to the right acetabulum, and thence to the pubal arch; and that without any assistance given by the accoucheur.

It is true that this favorable rotation sometimes requires the aid of the hand, or even of an instrument, as shall be described on the proper occasion. It also occasionally happens that neither the hand alone, nor any instrument can enable the surgeon to bring the vertex round to the front. In such case, it slides into the hollow of the sacrum, and the labor is thenceforward rendered more painful and more difficult. When, in fourth positions, the vertex can rotate first to the acetabulum and then to the arch, the labor is not seriously retarded, and the mechanism thenceforth is the same as has been already treated of and described; but when the posterior fontanel gets into the hollow of the sacrum, and will not suffer rotation, then the flexion must become greater and greater as the fontanel slides down along the point of the sacrum, along the face of the coccyx, and down the mesial line of the perineum, until, having thrust away the perineum 4.10—the occipito-frontal diameter—the vertex slips over the fourchette, and immediately turns over backwards, in strong extension. This allows the forehead, eyes, nose, mouth, and chin successively to emerge from underneath the crown of the pubal arch, to complete the birth of the head. The annexed figure (30) of a head in an occipito-posterior position shows these truths clearly enough.

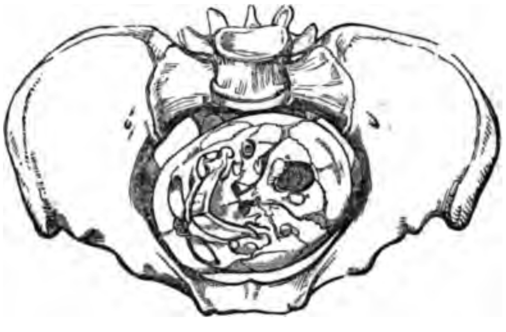
Fig. 30.



This is the mechanism in all cases of birth in occipito-posterior positions, failing rotation to the front; and the Student will clearly understand that it must be so, since the length of the line from forehead to vertex is too great to permit it to be otherwise.

Fifth Position.—The fifth position, as in Figure 31, is that in which the vertex is to the left ilio-sacral space, and the forehead to the right acetabulum. Here, as in the fourth position, the mechanical form of the pelvis tends to turn the vertex first towards the left acetabulum, and thence to the arch.

Fig. 31.



Sixth Position.—The sixth position finds the vertex at the promontory of the sacrum. Madame Boivin met with only two such positions in 19,614 cases.

I have seen a greater number of sixth positions than were met with by that celebrated midwife, although the labors witnessed by her so greatly exceed in number all that I have seen.

While the facts stated in her tables are to be relied upon for their historic accuracy, her statistical results cannot be admitted as the law of any practitioner's future experience. My own practice, for example, which has been a private practice, has shown me a far greater number of sixth positions than her vast clinical experience, in an immense lying-in hospital, brought to her view. Madame Lachapelle saw no such case.

A case of vertex labor in the sixth position occurred to me this day, of which I made the following note, in order that I might set it down here as a freshly-remembered experience.

CASE.—*July 8th*, 1848, 10½ A. M. Mrs. E—— I——, Pine street. This is the sixth child; a male, born fifteen minutes ago. The pains commenced moderately, at 4 P. M. yesterday, July 7th. Mrs. I. has been in pain at regular intervals all night. I arrived at quarter past nine, one hour since. The os uteri was nearly dilated; membranes unruptured. The anterior fontanel was touched through the membranes just behind the upper half of the symphysis pubis. By a strong pressure, I could conduct the index finger along the sagittal suture directly toward the sacrum, until I felt the triangular fontanel, leaving no doubt of the diagnosis. The left shoulder was at the right, and the right shoulder at the left ischium. The occiput was opposite to the top of the third segment of the sacrum; the flexion of the head was strong.

Partly by pressing with my right index the right temple and zygoma towards the right, and partly by pulling with the same finger the right leg of the lambdoidal suture towards the left side of the pelvis and downwards, I converted this sixth into a fifth position. I now discharged the liquor amnii by rupturing the bag of waters. The next pain rotated the vertex to the left acetabulum or first position, whence the vertex came forwards and to the right until it reached the arch, under which it began to extend, and was soon expelled.

During the act of extension and expulsion of the head, and just before the whole head was completely born, an act of restitution commenced: as soon as the head was free, the vertex went round again left-wards to the sacrum, and the chin of the child rested with its under surface upon the front of the pudenda, the face looking upwards.

This happened because the shoulders had not rotated at all, but plunged into the pelvis, the left one at the right, and the right one at the left ischium.

With the next pain the left shoulder came to the arch, and the right one to the sacrum, and so they were delivered. The child was about seven pounds in weight; in good health.

Here, then, was a clearly-marked case of sixth position, notwithstanding which, the mechanical force of the pelvis and its strange adaptation to the form of the cranium, permitted me, with very slight assistance, to convert it into a fifth, and then into a first position. This rotation was fortunate for the mother; since, by effecting it, I prevented the necessity of a dilatation equal to the occipito-frontal circumference nearly, and thus rendered necessary a dilatation equal merely to the bi-parietal circumference; the former being nearly fifteen inches, while the latter is not more than twelve inches.

Face Presentation.—When the head presents in extension instead of coming down in flexion, we have presentation of the forehead, or of the face. If the extension be moderate, the forehead presents; if it be very great, the face presents. When the face presents, it always comes down with the chin to one side, and the top of the forehead to the other side of the pelvis; and afterwards rotates the chin to the pubis or to the sacrum. In the case (Fig. 32), the chin is to the right ischium and the forehead to the left ischium. The natural movement of the mechanism would gradually turn this chin to the front of the pelvis, and the top of the forehead to the sacrum, as in Fig. 33.

Fig. 32.

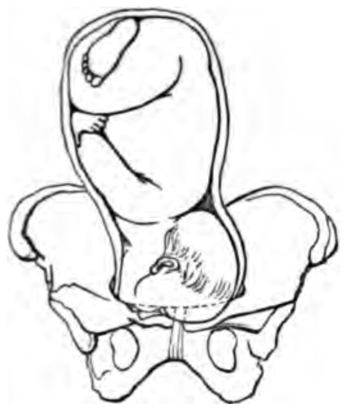
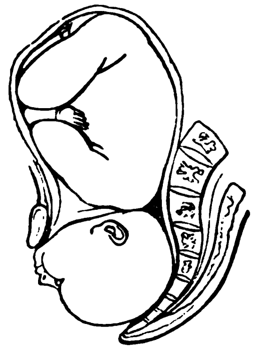


Fig. 33.



In face presentations, the chin must be born first; see Fig. 33. Here observe, that from the chin to the vertex is more than five inches, while there is no diameter five inches long to be found within the true pelvis. Hence, if the mental extremity of the occipito-mental diameter descends into the cavity before the occipital extremity, it must escape first from the outlet in order to allow the occipital extremity to escape last, and *vice versâ*.

There are many cases of face presentations that appear to afford remarkably easy deliveries, and to require no aid from the hand. In all those, however, where assistance is demanded, there is an important doctrine, one that should never be lost sight of in the Conduct of the cases. The doctrine is this—Bring the chin to the pubis. The figure may show that, if the chin be brought to the pubis, it will have to sink only an inch, or an inch and a quarter lower than the brim, in order to get below the level of the crown of the arch. As soon as it reaches that point, it comes out beneath the arch, and thus the mental extremity of the occipito-mental diameter begins to be born. When this first step is effected, the whole length of that diameter is soon expelled, or, in other words, the whole head is born; its occipital extremity being the last portion to emerge from the ostium vaginæ.

Should any one, in practice, forget this doctrine, and bring the forehead to the pubis, he would do a great wrong; for, as the chin must be born first, and the occiput last, the chin will have to slide along the whole length of the sacrum, five inches; and over the extended perineum two and a half or three inches before it can escape: but, to do this, it will be required that the head and half the thorax of the child shall be together jammed within the excavation; for, from the chin of the child to the top of its sternum are not eight inches. Such a position is almost sure to demand an embryotomy operation for the delivery of the fœtus.

CHAPTER III.

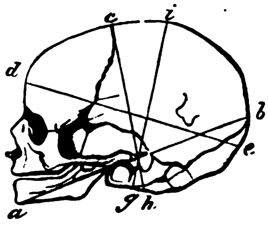
OF THE CHILD'S HEAD AND OTHER PRESENTING PARTS.

The study of the form and dimensions of the child derives its importance from the relations of the fœtus to the bony pelvis, through which it is destined to pass in the act of parturition.

To know the form and magnitude of the head, as related to the pelvic canal, is of the highest importance; and, indeed, no man should be looked upon as a qualified practitioner who suffers himself to remain ignorant of every particular of the matter now referred to.

The fœtal cranium, divested of the bones of the face, closely resembles in form an ostrich's egg, upon the side of the lesser pole of which the facial bones are adjusted.

Fig. 34.



In the figure of the fœtal head which is annexed (Fig. 34), it is evident that if the bones of the face were removed, the remainder of the cranium would be oviform; as I have on different occasions shown it to be, by removing those bones in presence of my class at the Medical College.

In looking at the head from above downwards, as in Fig. 35, page 72, the bones of the face are out of sight, and the cranium is evidently egg-shaped, the greater pole being at the occiput, while the lesser is at the forehead.

The fœtal head (Fig. 36) is copied with the camera from a cast of a fœtal head, and gives a proper idea of the true form when covered with its integuments: the child perished in the labor, its head being too large to pass through the straits without the aid of the forceps.

The longitudinal diameter of this oviform skull has, by most authors, been computed at four inches, and its conjugate at three inches and a half; both of which calculations are considerably under the mark of truth, as I have found by careful measurement.

Fig. 35.

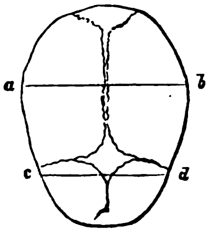
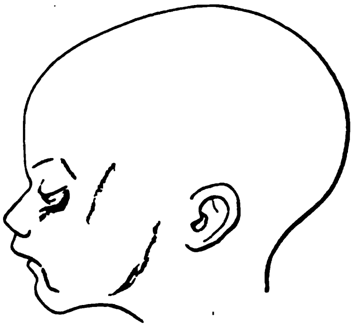


Fig. 36.



The bones that enter into the composition of the skull, excepting the face pieces, are the os occipitis, the two ossa parietalia, the os frontis, the two ossa temporum, and the sphenoides. These are the bones that make up the principal bulk of the object, for the face bones do not add very considerably to the magnitude of the mass.

The face bones are the maxilla inferior, the maxilla superior, the ossa malarum, ossa nasi, ossa palati, and the vomer. It seems hardly necessary to mention the ethmoides and the ossa unguis.

In a neonatus, the process of ossification is not completed, and the edges of the cranial bones are not locked or dovetailed together by the serræ of the adult suture; whence it happens that the cranium is not a fixed magnitude or form, but liable to alteration under the pressure of the parts through which it is driven by the great force of the labor-pains.

A great advantage is found in this mobility of the cranial bones, in certain instances in which the pelvic circumference is too small, either absolutely or relatively; for, the child's head of four inches in its conjugate diameter may, by the pressure, become reduced or wire-drawn so as to pass through a superior strait of only three and a half inches, or even less; and that without injury to the head, which, as soon as it has escaped from the pressure, begins to recover its normal form again.

There are, on the other hand, to be met with certain specimens of the fœtal cranium so solid and firm in their ossification as to yield not at all in labor, which is thus rendered both more painful and difficult. The young practitioner therefore should, in difficult cases, take comfort from discovering by the touch that the fœtal head is of a yielding nature, and hence not likely to resist too long the moulding or modelling efforts of the throes.

Diameters of the Fœtal Head.—In the fœtal head at term, of which there is a drawing at Figure 36, we are in the habit of imagining certain lines called diameters, which are represented in Fig. 34. There is a line traced from the chin *a*, to the vertex or point of the head or occiput *b*, called by the English writers the oblique diameter, but which the French authors have induced us, of late, to denominate occipito-mental diameter, a phrase that explains itself. The next one is the line from *d* to *e*, called the occipito-frontal diameter, as indicating the distance from the occiput to the most salient point of the forehead. After this comes the perpendicular diameter, from *c* to *h*; and lastly, in Figure 35, the transverse or bi-parietal diameter, which passes from one parietal protuberance to the other, from *a* to *b*; and the temporal diameter, from *c* to *d*.

As to these diameters, I have never deemed it expedient that the student should charge his memory with all of them: yet he ought to know that the occipito-mental diameter is above five inches in length. He ought to know this, in order that he may also know that such a diameter cannot be see-sawed, or reversed, after the head has once fairly entered into the excavation, in which no space exists large enough to render such a change possible. If the extremity *b* descends first, it must escape first, or be returned above the superior strait; and if the extremity *a* descend first, it must escape from the inferior strait first, or be returned above the linea ileo-pectinea, in order to be there see-sawed.

The occipito-frontal diameter *c a* is four inches and ten-twelfths of an inch in length,—a diameter too considerable to admit of its being see-sawed in the excavation, except under very extraordinary circumstances, for there is, in general, not space sufficient for that end.

I speak with very great confidence as to the above estimate, for I have carefully measured and recorded the size of three hundred crania of mature children that I received in the course of my obstetric practice. The Student will be in error if he adopts the common estimate of the authorities, which is too low at four inches.

In a single series of one hundred and fifty heads, I found the occipito-frontal diameter in fifty-two of them to exceed 5 inches. In 11, it was $5\frac{1}{12}$th; in 8, $5\frac{2}{12}$ths; in 3, it was $5\frac{3}{12}$ths; in 1, $5\frac{4}{12}$ths; in 1, $5\frac{6}{12}$ths; in 2, $5\frac{7}{12}$ths; and in 1, $5\frac{10}{12}$ths.

The sum of my occipito-frontal measurements was seven hundred and twenty-nine inches and seven-twelfths of an inch for one hundred and fifty crania. The mean was four inches ten-twelfths. The sum of the bi-parietal diameters of the said one hundred and fifty crania was five hundred and eighty-six inches and seven-twelfths,—the mean, three inches and eleven-twelfths of an inch.

The bi-parietal diameters exceeded four inches in sixty-eight of the children. In 19 it was 4.1; in 5 it was 4.2.; in 6, 4.3; in 3, 4.4; in 1, 4.5; in only one case was it less than 3.6, the usual estimate, and in that case it fell to 3.4.

A paper containing statements of the above series was read by me at the centennial celebration of the Amer. Phil. Society, on the 25th May, 1843, and was published in the "Proceedings," &c., Vol. III., p. 127.

I measured one hundred and twenty-six occipito-mental diameters of neonati at term, of which the sum was six hundred and ninety-nine inches and five-tenths, so that the mean or average of the one hundred and twenty-six diameters was five inches and a half. I know no one who has measured so many, and I am sure that greater accuracy is not to be attained by any person.

Upon these grounds, therefore, I am to inform the Student that the occipito-mental diameter of the fœtus is five inches and a half, the occipito-frontal four inches ten-twelfths, and the bi-parietal three inches eleven-twelfths.

The above statements ought to show that it is not a matter of small moment whether the head presents in labor by the vertex, the crown, or the forehead.

Upon the presentation depends the circumference of the advancing body: if the vertex presents, we have a circumference equal to thrice the bi-parietal diameter, which would equal a circle of eleven inches and three-quarters in circumference. The occipito-frontal diameter would give a circumference of upwards of fourteen inches, while the occipito-mental circumference would not be much under sixteen inches.

Fontanels.—The bones of the head are divided from each other by the sutures. In Fig. 35, showing a top view of the skull, may be seen the sagittal suture, a straight line which extends from the middle, and sometimes from the base, of the os frontis backwards, to the upper angle of the occipital bone, where it appears to dispart, branching into the two legs of the lambdoidal suture. In passing from the forehead backwards, this sagittal or arrow suture crosses the transverse or coronal suture, and at the place of crossing there is a large vacuity, as to bone, which is occupied, however, by the skin and by strong membranes which constitute what is commonly called the mould of the head—technically, the anterior fontanel, the great fontanel, the frontal fontanel, or the bregma. It is of various size in different specimens.

When the ossification is precocious, it is small; in the contrary case it is large, and sometimes it is found to be very large.

At the posterior terminus of the sagittal suture is found the posterior fontanel, often called the occipital fontanel.

There is a very great difference between the anterior and posterior fontanels; the former being quite large, quadrangular, and yielding to the pressure of the finger; the latter being so small that it can only be distinguished by the three suture lines that radiate from a common centre. Let the Student carefully learn to make this discrimination; for, if he should not do so, he will in practice find himself embarrassed in his diagnosis of the two fontanels.

Too much care can hardly be bestowed upon the mastering of these two points; nor can one become too familiarly acquainted with the differences between them; for, in trying to ascertain the precise position of any head-presentation, the accoucheur always seeks to place his index finger upon one or the other of these openings. It is clear that they must serve as points of departure in an exploration—for, if the index finger be in contact with the posterior fontanel, and the place that finger occupies in reference to any fixed point in the pelvis be well understood, the surgeon ought thence to deduce the very place of any and every other part of the cranium of the fœtus. To know where the fontanel is, is to know where to conduct the hand, the forceps, the perforator, or the crotchet.

It has been seen, in a preceding page, that the various positions assumed by the head when it presents in labors, are enumerated, as first, second, &c., and that they are determined by reference to the point on the pelvis to which the posterior fontanel is addressed.

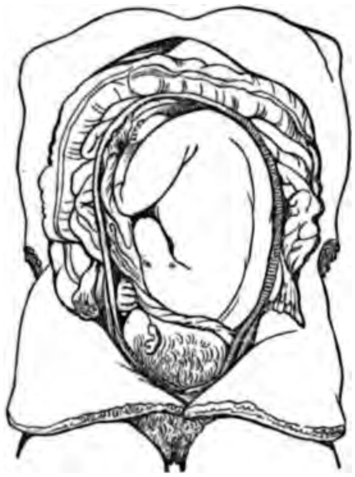
Presentations.—The Student who shall have made himself master of the subject of the pelvic diameters is now enabled to appreciate the differences that arise in labors exhibiting unfavorable presentations and positions of the head. He knows that the bi-parietal circumference of the head is not too great to admit of its ready transition through the excavation—and he as clearly understands that the occipito-frontal or the occipito-mental circumference would prove too large for the canal. Therefore, in any case of delay or difficulty, he would provide for effecting a coincidence of the bi-parietal circumference with the planes (of the excavation) through which it must necessarily pass.

If the pelvis be only four inches in its antero-posterior diameter at the superior strait, the occipital pole of the occipito-frontal diameter must dip so as to allow the vertex to descend, and thus become the presenting part. In fact, the fœtus lies so packed up in the womb that it may be said to be in a state of universal flexion—the legs are bent upon the thighs, the thighs upon the trunk; the arms and forearms and the whole spinal column are in flexion—so that even the head is found to be flexed on the neck as a normal condition of the fœtus in utero.

The form of the flexed fœtus is like that of an olive. One pole being directed to the fundus, and the other to the os uteri, gives thus two distinct, primary presentations—one cephalic, and the other pelvic, as shall be more clearly shown by and by.

The drawing exhibits very naturally the usual presentation and position of a child at the beginning of a labor. It represents the womb opened, with the fœtus in what is called a vertex presentation in the first position; *i. e.*, the posterior fontanel is turned towards the left acetabulum of the mother's pelvis, and the vertex, or occipital pole of the cranium, dips sufficiently to allow of its entering the pelvis through the plane of the superior strait.

Fig. 37.



The drawing also shows how very much the spinal column is curved. It is manifest that, if pressure should be made upon the pelvic extremity of the column, in a direction from above downwards, it would be still more considerably bent—it would be an elastic resisting arch; and the outward thrust of the cervical extremity of that arch would tend to flex the head, more and more, in proportion to the increasing violence of the thrusting effort, so that the lower the head descends, the more must the chin be pressed against the breast, and the more perfect the coincidence of the bi-parietal circumference with the planes of the excavation through which it happens to be passing.

Unfortunately, the occipital extremity of the occipito-frontal diameter does not always dip, and the frontal extremity of it is sometimes found to be the dipping pole. In such an instance, the chin is said to depart from the breast, and we discover a presentation of the crown of the head, the forehead, or even of the face, the head in the last-named case becoming completely extended, instead of descending in flexion. But the account of these accidents must be deferred until we come to treat of those special presentations, which we hope to be able fully to explain and describe.

The child at full term is about nineteen inches in length. Specimens are occasionally met with of children twenty-one inches high; but they are rare.

The average weight of a new-born child is somewhat above seven pounds; very many of them weigh eight pounds; and it is by no means a rare occurrence to find a child weighing nine, ten, eleven, and twelve pounds at birth.

I have never seen one yet that weighed fourteen pounds. The largest one I have weighed was thirteen pounds and a half avoirdupois. The mother soon afterwards perished with inflammation of the womb and bowels. To witness the birth of such a monster is appalling. I have heard of children of seventeen, and even of eighteen pounds' weight at birth. Such relations always lead me to suppose that some mistake has occurred in weighing the infant. M. Velpeau shrewdly remarks that children of that weight are children of three months old, and that such magnitude is impossible at birth. My own clinical experience, which has been very abundant, has never enabled me to see a child of fourteen pounds' weight at birth.

The head of the child exceeds, in its smallest circumference, the circumference of the thorax and shoulders, or the abdomen or the hips; wherever the head can pass, there will, therefore, be space for the transmission of the natural body.

The length of the child, folded up in the womb in flexion, is about eleven inches from the summit of the head to the lower extremity of the pelvis, or buttocks.

In about forty-nine out of fifty cases of pregnancy, the head is at the os uteri—in one out of fifty cases, the pelvis is at the os uteri, giving us the breech, feet, or knee presentation.

When the head presents in labor, it is to be supposed that it has presented during the entire gestation, and *vice versâ*.

The vulgar notion that the child lies in the womb with its head to the fundus until labor is about to commence, and then turns its head downwards to the mouth of the organ, in order to escape head foremost, is erroneous—for the child is eleven inches long, and cannot turn itself in a womb only seven or eight inches in conjugate diameter. If, in like manner, the breech presents in labor, we infer that it has presented for many months antecedent to the commencement of the parturient efforts.

Hippocrates said the child is packed up in shape like an olive in a narrow-necked flask: if one or the other pole of the olive presents itself at the aperture, it may escape; otherwise, it must be turned or broken, or the flask must be broken, in order to extract it.

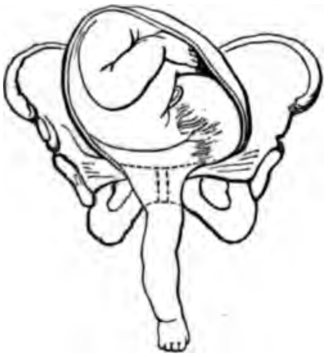
The same is true in midwifery. Either the cephalic or the pelvic pole of the fœtal oval must descend, in order to its birth; and it is a matter of little moment which should be the pole, whether the cephalic or the pelvic, all other things being equal.

Upon the whole, the head presentation is the most favorable for both mother and child, since nature provides that its frequency shall be in the ratio of forty-nine to fifty.

Two Presentations only—Cephalic and Pelvic.— Rigorously speaking, there are but two presentations in midwifery: one of the head, Fig. 37; the other of the pelvis, Fig. 39. The idea expressed in the word Presentation, is one relative to the part of the fœtus that comes to the opening; while the idea conveyed by the word Position, refers to some relation betwixt a cardinal point on the walls of the pelvis, and a cardinal point on the presenting part. Thus, in the pelvis, the cardinal point is always the left acetabulum—on the head, the cardinal point is the vertex or the chin. On the breech, the cardinal point is the sacrum of the fœtus. For the shoulder presentation, the cardinal point is the whole head of the child.

As to the head presentation—it may deviate, and allow a shoulder to come to the os uteri: but this is a mere accident of a cephalic presentation: an accident that has arisen from the impinging of the head upon the margin or brim of the pelvis, whence it has glanced upwards to the iliac fossa, permitting the shoulder to take its place. This is to be seen by inspecting the cut, in which the child's head, which originally presented, has deviated, and gone above the plane of the superior strait, lodging itself in the left iliac fossa, while the shoulder has come to the strait, and allowed the arm to prolapse.

Fig. 38.



The cut may serve to show how the hand and arm have merely prolapsed; making what is commonly denominated an arm presentation: but is it not clear, the head having gone up, that the shoulder still really presents, and that the arm has only fallen down or prolapsed?

From the above, it appears that we have—

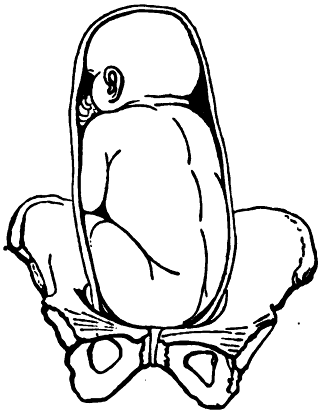
1st. Cephalic presentations;

2d. Cephalic presentations deviated, with descent of the shoulder; and, lastly,

3d. Cephalic presentations deviated, with descent of the shoulder, and prolapse of the arm.

Here is a drawing representing a breech presentation, or presentation of the pelvic extremity of the fœtal oval. This is the second normal presentation of the child, the cephalic being the first. In this case, an accidental deviation might cause the buttock to glance upwards on the brim of the pelvis, to take its lodgment in the left iliac fossa. Such an accident would give rise to a footling labor, or to a presentation of the knees.

Fig. 39.



A footling presentation, then, is only an accident happening in the course of a pelvic presentation—and the same may be said of the knee cases, which are very rarely met with.

I recommend these views of presentations to the Medical Student, who, if he should adopt them, will find his notions of midwifery greatly simplified, and his memory not loaded with useless divisions and descriptions that serve only to embarrass him as a student and perplex him as a scholar or practitioner. These are the divisions I have proposed in my public lectures; and, having found them convenient also at the bedside, I with confidence advise him to prefer them to the long catalogue of presentations in the books. Knowledge in its nature is simple, pure, not complex; it owes its seeming complexity and abstruseness only to man.

If the Student should ask me where I will place the presentations of the belly or the back of the fœtus, I cannot inform him, for I do not know whether they be derived from deviations of the pelvis or from deviation of the head. I am sure, however, that all such cases are accidents either of the cephalic or of the pelvic presentation, which is the essential point.

Positions of a Presentation.—The word position refers to the relation between a certain cardinal part of the presentation, and a certain cardinal part of the pelvis. Thus in vertex presentations, the posterior fontanel may be in the fifth position, that is to say, the occiput of the child may be directed to the left sacro-iliac junction, and its forehead to the right acetabulum; but the cardinal point on the pelvis is the left acetabulum, from which we count the first, second, third, fourth, fifth, and sixth positions.

Care should be used to avoid confounding the terms presentation and position.

A vertex presentation is one in which the head presents in flexion. A face presentation is one in which the head presents in extension.

There are six positions of the vertex presentation:—

1st. Vertex to the left acetabulum.
2d. Vertex to the right acetabulum.
3d. Vertex to the symphysis pubis.
4th. Vertex to the right sacro-iliac junction.
5th. Vertex to the left sacro-iliac junction.
6th. Vertex to the promontory of the sacrum.

There are two face positions:—

1st. The chin to the right side of the pelvis.
2d. The chin to the left side of the pelvis.

There are four positions of the pelvic presentation:—

1st. Sacrum to the left acetabulum.
2d. Sacrum to the right acetabulum.
3d. Sacrum to the pubic symphysis.
4th. Sacrum to the promontory.

In the shoulder presentations there are four positions—two positions for each shoulder.

First RIGHT-SHOULDER-position; the head is in the left iliac fossa, the face looking backwards.

Second RIGHT-SHOULDER-position; the head is in the right iliac fossa, the face looking forwards.

First LEFT-SHOULDER-position; the head to the left, looking forwards.

Second LEFT-SHOULDER-position; the head to the right, looking backwards.

These being the principal presentations, with their several positions, I shall enter into fuller details of them when I come to treat of the special labors in which they require to be managed by the accoucheur.

CHAPTER IV.

THE ORGANS OF GENERATION.

The organs of generation are divided into external and internal, the latter term being applied to those that are contained within the cavity of the pelvis, and the former referring to those that appear upon the external surface of the pelvis.

The external sexual organs, in the aggregate, are indicated by the word Pudenda; a word very happily selected as a reference to, rather than a direct denomination of, a part of the body which the sex, without exception even of any barbarous tribes, endeavor modestly to conceal from every eye. We are told that the first sinful indulgence of the human appetites was succeeded by the deepest consciousness of exposure, upon this subject; and the fig-leaf, which concealed the shame of the first woman, is a simple expression or emblem of female delicacy. The Venus de Medici is not less a representation of female modesty than of the utmost perfection of the female form: its modesty is the key to that inimitable, absolute, and pervading beauty, which places it at the head of the ancient works of art, and renders the statue at once a truth in morals, and a profound homage to one of the best attributes of woman.

Notwithstanding the aversion of females to every allusion to the pathological or obstetric affections of these organs, it is unavoidably incumbent on the practitioner to make himself acquainted with their anatomical structure, since they are the seats of diseases and accidents, and the agents of pathological and surgical processes, which the practitioner is often called upon to superintend; and it would be the grossest injustice to the female patient, to assume the conduct of some of her sexual disorders, without a perfect preparation for the discharge of duties which, by their importance, necessarily take precedence of those considerations that, under other circumstances, it would be both wicked and disgusting to pretermit. Let the Student of Midwifery, therefore, experience no sentiment at variance with the *mens* *sibi conscia recti*, in turning his attention to this portion of our subject.

Pudenda.—The portion of the body in front of, and just above the symphysis of the pubis, is raised so as to present the appearance of a protuberance, which, at the period of puberty, is covered abundantly with hair, and has received the denomination of Mons Veneris. The cutis, which covers this part, is supplied with numerous sebaceous follicles, and is ordinarily of a darker color than the general superficies. The size of the protuberance varies in different individuals, being greatest in those who are fat, and partially disappearing in those who are much emaciated, while the projecting ossa pubis upon which the mons is constructed, serve, in all cases, to lift it upwards above the general level of the surrounding parts. The subcutaneous structure is largely supplied with an adipose deposit, contained in cells connected by so dense a tissue, that inflammations and abscesses occurring within it, are rendered remarkably painful, as is the case in all such affections occurring in unyielding textures.

Vulva.—A little below the top of the pubic symphysis commences the genital fissure, which is most commonly designated by the term Vulva.

Labia Pudendorum.—The parts which are separated by this fissure are called the Labia Pudendorum, or Labia Majora. They are composed of the skin, which is disparted at the inferior portion of the Mons in order to admit of this construction, the division extending downwards to the lower extremity of the vulva, where it terminates in the inferior commissure of the vulva at the anterior edge of the perineum. The labia, which consist, externally, of cutis in all respects similar to that of the Mons, and, like it, covered with hair, are lined internally with an epithelium, that serves to protect the mucous surface beneath. The basis of their structure is a rather loose cellular tela, supplied less abundantly than the part above with adipose cells, and therefore liable, under circumstances of dropsical infiltration, of extravasation, or inflammation, to a great degree of swelling. The labia, since they serve as the outer limit of the vulva, are also liable to a great degree of elongation, or distension during the transit of the child in parturition. This distension is so great that it equals a circle of about ten or twelve inches in circumference. As the superior commissure of the vulva is found at least one inch above the bottom of the symphysis pubis, and the fœtal head passes out between the top of the pubic arch and the inferior commissure of the vulva, the Student will appreciate the very great extensibility of the labia majora; nor will he experience any surprise upon being informed that a great force is required to overcome their resistance; that much time is often consumed for that end; or that the labia are occasionally ruptured before they become sufficiently extended to admit of the escape of the head. I have seen several instances in which one labium was broken off transversely during the transit of the head in a first labor. No evil consequences ensued in those instances, the wounds uniting by the first intention, or more slowly healing by the process of granulation.

Labial Thrombus.—When the labia are put excessively upon the stretch, it occasionally happens that one or more of the ischiatic vessels, with which they are abundantly supplied internally, give way, and that a quantity of blood is soon poured out into the cellular tissue within. The extravasation may amount to only a teaspoonful, or may equal half a pound. Of course, in such a case, the labium must be greatly swollen, and of a dark color, and very severely painful: even sloughing of the part sometimes ensues. The swelling is generally discovered soon after the conclusion of the labor, rarely before the labor is over. I have recited the circumstances of an interesting case of this labial thrombus, in my letters on *Woman and her Diseases*, p. 74, to which I refer both for the case and for extended remarks upon the accident generally.

When the occurrence of a rupture of vessels, pouring the blood into the texture of the labium, is discovered, it is proper at once to take certain precautions. The blood may be removed by making a free incision, to be practised upon the internal surface of the labium; which indeed will be most easy to come at, because, in extensive swellings of this part, there is always eversion of the labium and not inversion, in consequence of the greater density of the cutis. The same thing is observed to happen in swellings of the lips, which seem to be then everted, as also in swellings of the eyelids, where some degree of ectropium is a common result of great distension.

Œdema Labiorum.—Pregnant women are frequently afflicted with œdema of the lower extremities; the swelling, in some examples, extending up along the thighs, whereupon the watery infiltration causes a great distension of the labia soon after the fluid reaches them. I have seen a case in which, notwithstanding, antecedently to the approach of labor, I punctured the labia repeatedly so as to permit the serum freely to escape, the labia and perineum remained so swollen and hard, as to produce the highest degree of embarrassment during the parturient efforts. The Student will perceive how inconvenient it must be to have the whole perineum and labia pudendorum not only swelled, but hardened by the pack of the serum within their loose cellular membrane. Such a state is most particularly to be deprecated, when we have occasion to resort to a forceps operation. In a forceps operation, where the head is still inconveniently high in the pelvis, a thickened and rigid perineum is a deplorable obstacle. I have met with a case of the kind that wholly baffled all attempts to adjust the forceps—because the posterior commissure of the vulva could not be made to go far enough backwards to enable me to lock the joint of the instrument, so that I was, at last, with the concurrent opinion of the late Professor Dewees, compelled to perform an embryulcia operation.

I have met with numerous cases in which the perineum, as well as the labia, being thickened, the pressure of the descending child soon and easily dispersed the waters of the infiltration: nevertheless, I think that in all instances where the swelling is great, several punctures should be made with a lancet, towards the close of pregnancy, in order to permit the fluid to escape. A lesser degree of tumefaction does not demand so unpleasant a remedy, the water of the cellular tissue being readily pressed out by the advancing head, and dispersed into other portions of the cellular texture in the vicinity of the vulva. The punctures may, however, be very safely made, and the operation gives no great pain.

Labial Abscess.—The labia, occasionally, are the seats of abscesses that are excessively painful. They always point towards the inner surface. For the most part, they suppurate rapidly, and should be opened as soon as a deposit of pus can be ascertained to exist. Few instances will probably be found in which the medical attendant shall be able to discuss such inflammations, since their location deters the female from calling for his aid until intolerable pain or inconvenience compels her to do so; and since, at such a stage, suppuration will, for the most part, be found inevitable.

Whenever it is deemed practicable to effect a resolution of such inflammation, it ought to be attempted; for we know not what change of structure may take place, in consequence of abscesses in the labia. Whatever causes tend to affect the labia with permanent alterations of their form or density, are to be always carefully obviated, since the part they perform in labor is highly important. A bleeding from the arm, followed by leeches to the part, and fomentations with decoction of linseed, saturnine applications, &c., will be proper, upon the institution of an attempt to discuss an abscess in the labium.

Cohesion of the Labia.—In young children, it not unfrequently happens that the inner face of the labia pudendorum becomes irritated, which produces an adhesive inflammation, uniting the surfaces that are in mutual contact. The inevitable evacuation of the bladder will, of course, always prevent a union of the whole extent of the labia.

In all the instances of this kind that have fallen under my notice, I have found it sufficient to separate the cohering surfaces by forcing them apart with the fore and middle fingers of the left hand, while, with the end of a probe, drawn down directly upon the line of union, the adhesions are next destroyed, and that without occasioning the least bleeding. The scalpel has never been required. In performing this operation in a good light, it will be seen that the union of the surfaces has taken place by the mutual interlocking of very delicate villi, much in the same way as the placenta and cotyledon of the sheep or cow are interlocked: the villi that are pulled apart in this process are exceedingly delicate. I have been struck with this resemblance on several occasions. I have no doubt, however, that a case might occur, in which, by long neglect, the union should acquire so great a degree of solidity as to yield only to the knife.

When the labia shall have been separated, in these instances of cohesion, they may be carefully kept from coming in contact by a pledget covered with cerate, as the adhesive tendency is renewed by the very violence which is required to obviate the consequences of a preceding irritation.

M. Colombat, in his *Treatise on the Diseases of Females*, advises us to touch one, not both, of the recently separated surfaces, with a nitrate-of-silver pencil, in order to produce on that surface a state of vital action different from that existing on the uncauterized surface; which he supposes must effectually obviate the tendency to cohesion. His idea is, that, to adhere, both surfaces must possess the same adhesive temper. For my part, I have found it, in all instances, sufficient to direct the nurse to draw the point of the little finger, dipped in oil, strongly downwards, from the anterior to the posterior commissure. Such a process, daily repeated, effectually sets aside all possibility of re-establishing the cohesion of the labia.

Differences of the Labia.—The appearance of the labia in virgins is different from that observed in females who have borne children. In the latter, they present a somewhat shriveled or collapsed appearance, except in fat persons; and the inner surface, which in virgins is of a rose tint, becomes bluish or black in the aged, or those who have had children. The inferior commissure, also, is lower down in women who have borne children; whereas, in the virgin state, the lower commissure crosses the pubis almost as high up as the top of the triangular ligament. This is observable in most young females, examined early, in a first labor.

The Nymphæ.—The Nymphæ are also called labia—labia minora, labia interna. They differ from the greater labia in that they consist of a duplicature of the mucous membrane covered with a strong epithelial surface, and containing an erectile tissue; whereas the greater labia have a basis of adipose texture possessing no erectile structure. In young persons, excepting neonati, the nymphæ are wholly concealed within the genital fissure; but in those who are somewhat advanced in age, and who have borne children, one of them may be commonly observed to protrude beyond the vulva, a circumstance which depends not more upon a change of its proper structure, than upon the shrinking of the labia consequent upon advancing age and repeated parturition, as has been already mentioned. The top of the nymphæ is but little below the superior commissure of the vulva, and each nympha descends obliquely outwards, generally terminating rather more than half way down the labium of each side. This arrangement gives it the appearance of a pointed arch.

The color of the nymphæ, in young persons, is a lively red; they are thin, and their surface is not corrugated; whereas, in women who have borne children, they assume a darker hue, and are sometimes observed to be very much thickened and corrugated, not unfrequently presenting a lobulated appearance. Haller informs us that hairs are occasionally found to grow upon them. They are supplied with a peculiar kind of sebaceous matter, which, in uncleanly individuals, accumulates in considerable quantities, giving rise to a disgusting fetor.

It is useless to inquire into the motives for bestowing upon this organ a title which appertains to the divinities that preside over fountains. It is at least certain that these bodies exercise no influence over the sources or direction of the urine. It is asserted that they subserve a very important end, to wit, the supply of an additional material for the distensions which these parts undergo in the last moments of labor, thus diminishing the risk of rupture of the external parts of generation. I have, however, repeatedly ascertained, that, at the instant of the extremest distension of the vulva, the nymphæ are not effaced, but can be distinctly felt, like a firm ridge, little less elevated or marked than in the most entire repose of the organs. It is easy to verify this fact in any case of labor.

There is high authority for the assertion that they are the subjects of erection under the excitements of the sexual passion, and possibly they may concur, therefore, in the production of the orgasm which seems essential to fecundation. It is proper to say, however, that the uses of the nymphæ are unknown, for they do not exist in any other species of mammalia.

Notwithstanding that the folds of the nymphæ are not effaced or flattened out in labor, it sometimes happens that, while contingently elongated by the extension of the labia, they suffer laceration. Like all other living tissues, they are obnoxious to inflammatory diseases, which are often extremely painful. The treatment of abscesses of these parts is conducted upon the same principles and indications as occur in those of the labia majora.

In some cases of young children, the anterior edges of the nymphæ become coherent from an adhesive inflammation developed in them. If the cohesion extend far downwards, the two nymphæ form a sort of curtain or flap in front of the urethra. This accident causes the urine, which cannot flow off *pleno rivô*, to dribble over the surface of the vulva and perineum, giving rise to painful excoriation. In a specimen mentioned by Colombat, the upper portions of the nymphæ had not cohered, while the lower portion obstructed the urine and compelled it to rise upwards to escape beneath the clitoris. This gave rise to a urinary distress which was only relieved by the surgical separation of the cohering margins. M. Colombat cites several interesting cases of the kind.

In those individuals in whom they protrude beyond the external surface of the vulva, excoriations of them are occasionally met with. Where such excoriations are rebellious under treatment, it is best to remove the protruding portion by the scalpel or scissors. This operation may be safely resorted to, since it is a prevalent custom among many tribes of Arabs and Moors, and also of the Coptic inhabitants of Egypt, to apply the rite of circumcision, or rather excision, to the young female.

It cannot be needful, in a work so limited as this, to enter into investigations concerning the so much talked of *tablier des Hottentotes.*

For an ample account of the subject, I refer the curious Student to Mr. Lawrence's *Phys. and Zool. of Man*, page 420, where a very considerable number of authorities may be found. M. Merat's remarks on the same subject may also be examined, *sub voce*, in the *Dict. des Sci. Méd.*

An account of the Hottentot apron may be found also in the *Annals of the Museum of Natural History*. It was furnished by M. Fred. Cuvier. There is no reason to suppose it is a case of hypertrophy. All travelers in Southern Africa now agree that it is an ethnographical characteristic of the Bushman woman.

The Clitoris.—The word *clitoris*, according to De Graaf, in his *Treatise de Mul. Org. Gen. Inservientibus*, p. 16, is derived from κλειτοριξειν quod hanc partem lascive fricare ac contrectare significat. It is the organ of touch for the aphrodisiac sense.

The tip of the clitoris juts out under the summit of the pointed arch formed by the union of the upper ends of the nymphæ. The clitoris possesses very considerable analogy to the male penis: it consists of two corpora cavernosa possessing two crura, which, like the crura of the male penis, are attached to the ossa pubis; and the analogy may be further prosecuted, by attending to the manner in which the deep crescentic fold of the upper part of the nymphæ surrounds the apex of this organ. This fold is called the preputium clitoridis. The clitoris differs from the male penis in that it possesses no corpus spongiosum, and of course can have no real glans, or urethral canal. Yet, considering that the female urethra lies below or behind it, one may well discover a closer analogy, as the female urethra, though separated from the corpora cavernosa of the clitoris, preserves the *plan* of the organic form. The clitoris is erectile, and is endowed with the most intense erotic sensibility. The uses of the organ are probably to be sought in this peculiar endowment. Its asserted universal occurrence in the mammalia bespeaks its importance.

I could never discover a clitoris in many females of the Didelphis Virginiana that I have dissected with a view to discover it.

J. Müller, at p. 1464 of his *Physiology*, has a paragraph on the subject of the clitoris, in which he says, "that the clitoris of the mammal is of the same structure as the penis of the male embryo, both of them being formed upon the same principle of development. The embryo clitoris and the embryo penis at first resemble each other exactly, as to their external form. The corpus cavernosum is open or cleft, in both alike, so as to form an open canal. Both have muscles, ischio-cavernosi, and constrictores pudendi; but, when the perineum closes, in the progress of development, in the male embryo, the latter muscles become acceleratores urinæ. The clitoris becomes shorter, and the lips of its groove become converted into nymphæ."

Rudolph Wagner says, "that the generative organs are late in making their appearance, even later than the kidneys and supra-renal capsules. There is no trace of them at the end of the first month. The canalicular cleft of the penis is closed at the first month, and becomes the urethra. On the contrary, the edges of the cleft rise more and more, and become converted into nymphæ in the female."

Here I may venture to remark that this law of development does not apply to the mammiferous quadrupeds, which are wholly destitute of nymphæ. If the observations of the physiologist above named were correct, we should be at a loss to account for the failure of the analogy.

The clitoris is the subject, in some individuals, of so great a degree of hypertrophia, that it comes to bear a marked resemblance to the male organ. Such affections, doubtless, are the causes of a prevalent vulgar belief in the existence of hermaphrodites. The cases of monœcious vegetables and of some annelides, as the earth-worm and other inferior creatures, may be cited as examples of the double sex in an individual constitution. The Indian corn, for example, fecundates by its male organ its own female germ. But, notwithstanding that monœcious plants, and some of the lower orders of the animal kingdom, contain within their bodies the organs of a double sex, we are not authorized to admit that a similar condition can occur in beings of a highly complex organization, where an entire individuality of the male and female is and must be indispensable. The prayer of Salmacis, that her lover's body and her own might be united into a single one, although granted by the mythological divinities, leaves the sexual individuality both of Salmacis and Hermaphroditus undestroyed; and so must it always be in nature.

Wherever suspicions are entertained of the existence of an hermaphrodite, it will probably be found that an enlarged clitoris, or a bifid scrotum, presenting the appearance of labia pudendorum, has given rise to the suspicion.

The Urethra and Vestibulum.—Just on a line with the top of the pubic arch, is a small bulbous projection, which encloses the orifice of the urethra: the triangular space included betwixt this bulb, the nymphæ and clitoris, is called the vestibulum. It is important to understand its position, because it is always referred to in introducing the catheter, which is very easily executed if one has a correct knowledge of this part, and very difficult of execution in the absence of such knowledge. The lower part of the vestibulum is divided vertically by a raised line or raphe, which can be readily felt with the point of the finger, and leads directly to the orifice of the urethra, to which it should serve as a director in the operation above mentioned.

The female Urethra is from an inch and a half to two inches in length. It turns upwards and backwards, directly under the triangular ligament of the pubis, at the base of the triangular space above called vestibulum. In introducing the catheter, the point of the tube should be directed perpendicularly to the surface of the vestibulum, and introduced within the orifice of the urethra, and then, by depressing the handle, the point will turn upwards behind the pubal bone towards the orifice of the bladder. Notwithstanding the female urethra is so short, it often happens that the bladder, when much distended with urine, and particularly during labor, is carried very high upwards, so that the urethra is much elongated. I have several times been obliged to introduce the catheter fully four inches, before it would enter the bladder of urine. The urethra is also very much elongated in some cases of retroversion of the womb.

On account of the situation of the urethra, it is sometimes subjected to so severe a degree of pressure by the fœtal head, that it sloughs before or after delivery, and gives rise to the distressing symptoms of urethro-vaginal fistula. It is also subject to contusion and laceration in some of the forceps or crotchet operations; accidents that cannot be too carefully guarded against by every humane or considerate practitioner, as entailing upon the patient the most distressing stillicidium of urine. See, in the *Medical Examiner*, my account of a case of this kind cured by Dr. Pancoast.

The Hymen.—The Hymen is a fold of the mucous membrane of the genital surface, of the nature of a valvula connivens. It is a crescent, with the cornua directed forwards and upwards. It is situated just within the entrance of the vagina; and is ordinarily so thin and delicate as to yield to a slight force; whence it is often found to be wanting in adult persons, having probably been ruptured during infancy or childhood. Certainly, there are many very young subjects met with in the anatomical rooms, in which no trace of it is to be discovered. The fold of mucous membrane of which it is composed is broad in some, and very narrow in others. I am well convinced that I have, in many instances, met with the unruptured hymen during my obstetric practice.

I may venture to assert, that whoever attends a great many women in first labors will have occasion to observe the existence of a very narrow hymen in many pregnant women. I make this statement, not unaware that I may be charged with having mistaken the fourchette for the organ in question. I think, however, that my opportunities in midwifery practice for acquiring experience have been sufficiently ample to warrant me against the commission of so gross an error.

In some individuals, the hymen is not crescentic, but circular, with an opening in the centre, or in some other part of the plane; and a few examples are met with in which the hymen is imperforate. I refer to page 103 of my *Letters on Woman and her Diseases*, for a curious case in which the hymen formed a diaphragm in the vagina.

Instances are also recorded of such firmness in the tissue, that incisions have been required in order to allow of the delivery of the fœtus, which, by the resistance of the hymen, was prevented from being born.

The foregoing should serve to convince the Student that, as a test of virginity, this organ cannot be relied on, since it is often wholly wanting; so slightly developed as to oppose no resistance in coitû, or even in labor; and on some occasions, so strong as to require the aid of the surgeon for its destruction. In Nov. 1851, I destroyed one with a bistoury, that had prevented the consummation of a marriage for three years.

The barbarous practices of some of the African nations are worthy only of a barbarous people, and the distressing suspicions and doubts which sometimes are connected with vulgar errors on the subject of the hymen, ought, if possible, to be exploded. It appears to me to be the duty of the physician to speak in positive terms, and, whenever suitable occasions offer, to reprobate so useless and often injurious a dogma as that of the invariable existence of a hymen in the virgin.

Fourchette—Fossa Navicularis.—A space that exists between the Fourchette, which is the inferior commissure of the labia, and the hymen, is called the Fossa Navicularis. The fourchette is a pretty firm fold of the mucous tissue, serving to unite the lower extremities of the vulva. It is said to be generally ruptured in a first labor, which I do not think is true. It is doubtless often broken, and no evil consequences commonly ensue from the accident.

The Perineum.—Although the term Perineum should in strictness apply to the whole of the space between the point of the coccyx and the lower end of the genital fissure, it is commonly, in midwifery, used in a more restricted sense, and indicates that space which exists between the lower end of the vulva and the anus. It is from an inch to an inch and a half in length. It is covered externally, and below, with a dense but elastic skin. It is limited above by the vagina, and posteriorly by the rectum; for, as the vagina and rectum are united by what is called the recto-vaginal septum, it is evident that the pyramidal space betwixt this septum, the fourchette, and the anus, must constitute the perineum, using the word in its common acceptation.

It is, in labors, very thick in some women, and feels extremely hard and resisting; in others it is very thin, soft, and easily dilated. Upon its rigidity or its extensibility depends the amount of time which will be required for its dilatation by the fœtal head, or other presenting part.

The Student ought to pay great attention to the study of the perineum. Without a clear knowledge of its nature, and of its obstetric functions, he cannot comprehend certain phenomena in what is called the mechanism of labor. As I wish to avoid anticipating the subject, I shall only state, in this place, that to the resistance of the perinæum is owing the extension of the head; and that this extension happens because, when the vertex comes just below the crown of the pubal arch, in flexion, the energy of the pains is directed to the object of pushing away the perineum, in order to open the body for the birth. Now, while the crown of the head pushes the perineum off from the top of the arch, the perineum by its resistance thrusts the occipital bone of the fœtus firmly against that arch, holds it there in close contact, and thereby compels the vertex, as it emerges, to rise upwards, along the genital fissure and the mons veneris. When the extension is complete, the child's head is born. See Fig. 13.

I have already mentioned that the anterior edge of the perineum is, in many women, but little below the top of the pubic arch, and that the vulva is not opened until after the perineum has been somewhat pushed outwards and distended. It does sometimes happen that more than one-half of the fœtal head escapes from the lower strait, carrying out the perineum along with it, while the vulva is only opened enough to let the apex of the head emerge a very little. When distended in this way, the perineum is, perhaps, not thicker than the scalp, or even less so; covers the head like a cap; and, instead of being from an inch to an inch and a half long, measures between three and four inches. This great extension is sometimes kept up for a considerable length of time.

The time necessary for the complete expansion of the perineum is very different in labors. I have waited six hours by the bedside after the head had begun to distend this part, and witnessed repeated efforts of the womb to overcome the resistance, the head being always forced back into the excavation by the elasticity of the perineum and the contraction of the levatores ani, until, at last, some long and powerful pain has forced it through the birth. It is highly important, in making a prognosis, to have a very careful reference to the state of the perineum, as it alone often furnishes greater resistance, and consequent delay, than the os uteri, the straits, and the vagina together.

There are not a few cases in which it wholly refuses to dilate, and then the child is forced downwards at the expense of the tissue, which bursts or is rent asunder, allowing of the immediate egress of the head.

This laceration of the perineum generally takes place when the vulva is largely distended, the rupture commencing near the fourchette, and extending backwards as far as the anus, or even into the rectum. In other instances, the child has been expelled through a laceration of the perineum proper, not including the fourchette or any part of the vulva, the perforation being made betwixt the anus and vulva; the vagina being, of course, torn open.

When such accidents happen without involving the bowel or its sphincter muscle, no very bad consequences are likely to ensue, the parts readily healing, by the continued and close contact of the surfaces, with granulation.

Should very hard and extensive cicatrices be formed in consequence of such lacerations, the vagina and perineum may be rendered less fitted for the distensions of a subsequent labor, in which great care ought to be taken to obviate the repetition of so very untoward an accident.

Lacerations do not always commence at the fourchette. I have already mentioned cases in which the lower third of the right labium was broken off, and an irregular lacerated wound extended from that point towards the perineum. The accident cannot be always avoided, even by the greatest care and skill. I have recently seen a case of laceration, in which the wound, commencing very near and within the inner third part of the left nympha, extended downwards and backwards, and then upwards in the vagina, in such a manner as to have cut the tube nearly half off—a very singular case, and which must have been near allowing the head to come *through* the perineum. In all instances where the power that urges the child forth is very great, there is risk that the infant may be expelled before the perineum and vulva have sufficient time to dilate: they are, therefore, apt to be ruptured. Lacerations sometimes take place in forceps operations; probably from want of patience in waiting for the dilatation of the parts, time not being allowed for the yielding of the textures. It is the invariable duty of the accoucheur to see that the parts shall have time to relax and dilate before the head is permitted to emerge; an end which he can generally compass by supporting the perineum; making pressure against it so far as he may dare, aiding it to jam the occipital region closely against the crown of the arch, and thus, while the head is kept from advancing, permitting the tissues to acquire the proper temper or disposition to yield. This, however, will be more apropos when we come to treat of the management of labor.

The Vagina.—The Vagina is a membranous tube that connects the external with the internal organs of generation. Its length varies in different adult persons, being commonly longer in virgins than in women who have borne children recently, and especially in such as have given birth to a numerous offspring. It is also longer in pregnant women about the fourth or fifth month, in consequence of the rising upwards of the gravid uterus, which then rests at the brim of the pelvis. A portion of its upper and posterior part is attached to the rectum by the recto-vaginal septum, and it is united to the urethra by the vesico-vaginal septum: near its lower end it is provided with a sphincter muscle, that serves to close it with more or less force.

Occupying the middle of the pelvis, where the transverse diameter is more than four inches long, the sides of the vagina, when distended so as to receive the fœtal head, may be carried laterally as far as the planes of the ischia. A great distending force is often required for this purpose, and the practitioner is detained for hours in order to obtain the requisite dilatation of the vagina. Such resistance depends upon the unyielding nature of its own proper tissue, and not upon any obstinate opposition from the surrounding textures: there is nothing betwixt it and the ischia, except the levatores muscles and a very loose cellular tela, comprehended betwixt the folds of the ligamenta lata.

The lower end of the womb is attached to the upper extremity of the vagina. If the vagina becomes shortened and its two extremities approach each other, the womb sinks lower down into the pelvis than its natural level. If the vagina be subsequently elongated by any means, the womb is carried upwards again. A prolapsion of the womb is essentially a shortening of the vagina, and the cure of such prolapsions is to be effected by restoring to this canal its proper longitudinal dimension. A prolapsion of the womb is never a disease [illegible] tself, but of the vagina and other parts that support the [illegible]

[illegible] me to be almost a work of supererogation to make this [illegible] d yet I am led to do so because so much is said of the [illegible] suspend the womb.

[illegible] dent remember that there is a complete peritoneal *cul-de-* [illegible] ter Douglass, betwixt the rectum and the vagina. This is [illegible] *cul-de-sac* into which the fundus uteri falls in cases of [illegible] rsion. It is clear then that here at least there is no sus- [illegible] gament of the womb. The ligamenta lata do not suspend [illegible] merely stay it laterally, while the ligamenta rotunda serve to ret[illegible] t in normal propinquity to the pubis—or to keep it from oversetting backwards when a full bladder of urine tends to turn it over, or retrovert it. The anterior wall of the vagina, and parts of the womb itself, are connected with the bas-fond of the bladder.

Such are the means of suspension of this organ within the pelvis. Is it not manifest that an elongated vagina carries the womb upwards, while a shortened or relaxed one lets it fall down, and that prolapsus is a fault of the vagina, which in procidentia becomes actually inverted, and sallies quite forth from the genital fissure?

While in Bartholomew's Hospital at London in 1845, Mr. Edward Stanley showed me a case of procidentia uteri, in which the tissues of the vagina had become so enormously thickened—the womb, doubtless, also much engorged—that that able surgeon in vain endeavored, for a long time in my presence, to return the mass into the cavity of the pelvis. The woman was in much pain. The accident had happened several days before I saw the case. Mr. Lawrence was requested by Mr. Stanley to endeavor to replace the tumor—which he effected after considerable effort.

Fig. 40.

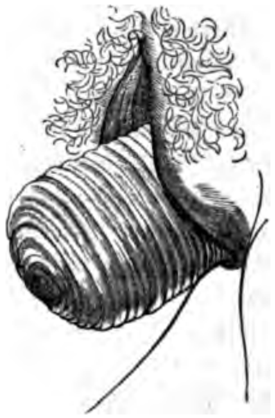


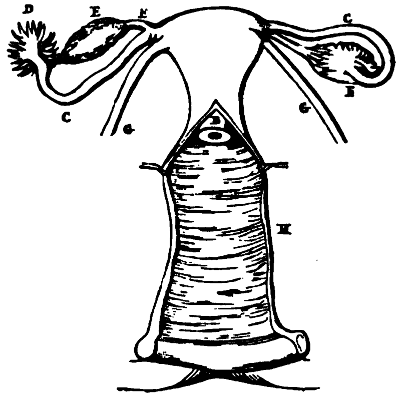
Figure 40 represents very well the appearance of a case which I was invited to attend with Dr. Hains of this city. The woman was about seven and a half months gone with child. There projected through the genitalia, a tumor as large as a man's arm and near five inches in length, covered with a dry epithelium. It was rugous, as in the drawing. At the lower end or point was a deep pit. Upon thrusting the finger upwards to the metacarpus, in this cylindrical canal, the os uteri of the gravid womb was felt on a level with the rami of the pubis. I returned the whole mass within the pelvis, but it came down again. It consisted of a thickened and inverted vagina. It was thickened by infiltration. A pessary was adjusted, but the woman would not wear it. At full term she gave birth, in an easy labor, to a healthy child. At the beginning of the labor it was down. The labor pains had hardly set in, before the whole mass retired within the ostium vagina, as I was informed by Dr. Hains, who attended her in the confinement. In the autumn of the year 1850, I saw a case very similar to the one above described. It was mistaken for a sample of inversion of the womb by the practitioner who called me to the case. The tumour formed by the thickened and infiltrated tissue of the vagina was large as my fist. The only remedy for such a case was to be found in a pessary.

The internal lining of the vagina is a mucous membrane, abundantly furnished with mucous follicles, whose secretions lubricate the parts in health, and particularly during labor, when their presence is of the greatest consequence. The parts, if deprived of it by frequent examinations, become dry and inflamed, which prevents their yielding to the distending forces, whereby the patient suffers protracted distress that might be easily avoided by abstaining from the Touch, and by preserving the humid and soft condition of the organ. Too frequent Touching not only removes the lubrication, but irritates the mucous membrane: it is greatly to be deprecated, as not only useless, but injurious as well as indelicate. A woman in labor should be examined as seldom as possible.

There seems to be a dissidence in the opinions of authors relative to the structure of the vagina, particularly that of its *tunica propria*, which is either a real fibrous tissue, or a mere condensed laminated cellular membrane. It is surely not muscular beyond the possession of a muscular sphincter that closes its lower extremity; and it possesses no other contractility than that which is called elastic, and which is common to the whole of the cellular structure. It closes speedily after the passage of a child, even one of a very large size. In some instances, where the child's head has lingered long in the vagina, an hour or more elapses before its calibre becomes much contracted. For some hours after the birth of a child, the introduction of the hand into the vagina may be effected with the use of very little force. The vagina is subject to eversion, or to complete inversion, where there is procidentia or inversio uteri. Of course such accidents can never occur, nor can any tendency to them take place, without deranging both the bladder and rectum in consequence of their textural connection with this organ.

The Womb.—The Uterus is attached to the upper end of the vagina. It is a pear-shaped body, compressed from front to rear, and varies in length, which may be from two and a half to three inches, rarely three inches; being larger in women who have borne children than in those who have never been impregnated. It is divided into fundus, body, and neck; the fundus being the uppermost, and the neck the lowermost part of the organ. The vagina is united to the womb in such a way as to permit its neck to project a short distance into that tube; in this regard also there is great variety, some women having almost half an inch of the cervix uteri hanging down in the vagina, while in others the connection seems to exist almost at the lower end of the cervix. *See the engraving.*

Fig. 41.

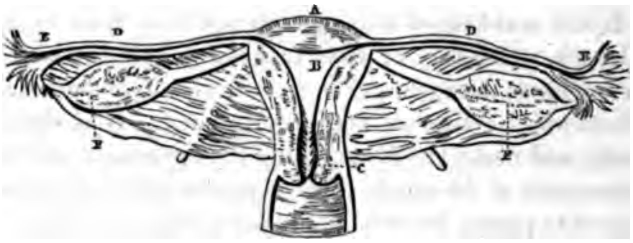


The cut represents the womb B, and the vagina H, laid open, in order to show the neck and mouth of the womb B projecting into the upper end of the vagina. In it are also seen the round ligaments G G; the ovaries E E; the ligament of the right ovary F, and the Fallopian tubes C C, with their fimbriated extremities D.

As the vagina is a curved canal, which proceeds backwards from the vulva, and upwards towards the rectum, it happens that the womb lies rather nearer to the sacrum than to the pubis. The womb is so situated that its long diameter is parallel to the axis of the superior strait, while the vagina is nearly parallel to that of the inferior strait; hence, at their junction, they make an obtuse angle of near 95°, any deviation from which implies a displacement of the womb.

Let the Student say the breadth of a womb is about an inch and a half; its thickness about one inch; its length two inches and a quarter: this is the mean. I subjoin a drawing that represents the internal organs divided transversely from top to bottom, and showing the front or anterior half: A is the fundus or bottom of the womb, which is the uppermost or highest portion of the organ. B is the triangular cavity, whose outlet is through the canal of the cervix (C), leading down to the orifice of the womb in the vagina, which orifice is called os tincæ, or os uteri. At D D are seen the left and right Fallopian tubes laid open, to expose the narrow passage by which the ova are conducted from the ovaria F F. E E are the fimbriated extremities of the tubes, which are also called morsus Diaboli, or Devil's-bit: they are the infundibula or ingluvies which take up the ova as they spontaneously escape from the surfaces of the ovaries, when expelled once a month. The wing-like expansion on each side of the womb is the broad ligament, and the round ligament is seen through it and in front of it on either side of the uterus.

Fig. 42.



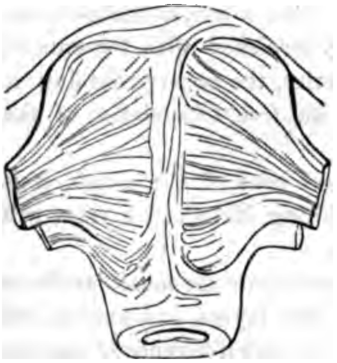
Suppose half an inch of the cervix uteri to project into the upper part of the vagina; then if the whole length be two inches and a quarter, we shall have one and three-quarter inches of the womb above the upper end of that canal. Such being the case, the womb would fall over to the right or left side of the pelvis, were it not restrained or stayed by what are called its broad ligaments, which, passing from its sides towards the sides of the pelvis, keep it steady, or prevent it from assuming an oblique attitude; it would also fall backwards towards the sacrum, and sometimes become lodged or wedged under the promontory of that bone, were it not restrained from moving in that direction both by its round ligaments, called by Fallopius its cremasters, and also by its connections with the bladder. It cannot fall forwards, for it is sustained by the bas-fond of the bladder, which, by filling with urine, must, and does always push it backwards again.

Structure and Powers of the Womb.—The substance of which the womb is composed has not been fully understood. In the unimpregnated state, it is dense and gristly to the feel, and cuts very hard; the cut surface being of a faint pinkish hue and a fibrous appearance; but those fibres are disposed without any apparent regularity or order. It is supplied with blood-vessels, absorbents, and nerves, which are very small during the unimpregnated state; but the same vessels in the gravid womb acquire an enormous size, and are exceedingly numerous and tortuous; so that, in fact, the ovum, at full term, appears to be contained within a vast network, or rete vasculosum, united together by a quantity of muscular fibres. The womb, at the full term, is an exceedingly sanguine organ, being furnished with torrents of blood from the uterine and spermatic arteries, the former reaching it from below, and the latter from above, with free inosculation of the several channels of circulation.

As to the interior membrane, or mucous coat of the womb, it is unnecessary to speak here: the cut, exhibiting Mr. Coste's view, will explain the matter with sufficient clearness.

Various attempts have been made to demonstrate the muscular fibres of the womb, and they have been divided into layers, and planes, and fasciculi for that purpose: but the very fact of such difference of opinion is proof enough that the arrangement of them is not yet clearly known. If it were known and demonstrable, there would no longer exist any dissidence concerning it, since whatever is clearly demonstrable, ceases to be a subject of dispute or doubt. This much, at least, is well known; namely, that the contractile fibres of the womb are capable of acting partially, or so as to change the form of one part of the organ, while another part of it acts with less intensity, or not at all. Thus, it occasionally happens that we find the uterus, after delivery, contracted in its middle, as if a string had been passed round it and drawn tightly, causing it to assume the shape of the hour-glass. This state is familiarly denominated an hour-glass contraction. Again, we not unfrequently find the whole organ elongated, and almost of a farciminal form; its fundus being raised high upwards, towards the epigastrium, while the body of it is narrow or slender like an intestine. I feel assured that I have sometimes found it, after delivery, full nine or ten inches in length, and not more than four inches in transverse diameter, estimated by feeling it through the relaxed integuments of the abdomen. These circumstances prove that the uterine fibres which affect the conjugate diameter of the organ may act with force, while those which affect its longitudinal diameter are either in a state of repose, or of very slight action; which leads us, as I think, to the inference, that the longitudinal and horizontal fibres are separate and independent organs or parts of the uterine structure. The annexed cut, from M. Chailly's *Midwifery*, gives a view of the arrangement of muscular fibres which seem to converge upon the tubes and round ligaments. Let the Student conceive of a separate, non-coördinate action in these fascicles of muscles, and he will perceive that such action might greatly embarrass a labor in which the contraction ought to be consentaneous and co-ordinate for the whole muscular apparatus of the organ.

Fig. 43.



If this be a just view of the case, it will serve for the explanation of occurrences in labor that would otherwise embarrass us not a little. For example, we find the woman in travail sometimes suffering under the most intense pains, and making the greatest efforts without the smallest profit; and that, too, where we know certainly that the pelvis is of the amplest dimensions. What can be the cause that the child does not advance under such vigorous efforts? We find that the head is positively stationary, notwithstanding the healthiest pelvic conformation, a sufficient dilatation of the uterus, and violent labor pains. We are at once satisfied, and relieved of anxious doubts, when we reflect that the horizontal or transverse fibres are active, and the longitudinal or perpendicular fibres inert. There is a failure of co-ordination in the movements, and our duty will be clearly seen to consist in endeavors to restore the synergy of contractile effort.

As this circumstance generally results from some excess of a local or constitutional irritation, the former occasioned by tedious or violent labor, rheumatism, officious intermeddling, or the direct stimulation of ergotism; and the latter by a too susceptible nervous system, repletion, mental emotions, or vain efforts of labor long continued: it appears that, in the former case, we ought to resort to the tranquillizing influences of laudanum clysters, cool air and drinks, and abstinence from impertinent handlings; whereas, in the latter, we may apply to the lancet, to a Dover's powder, to portions of morphia, or the black drop or opium, or the bath—after evacuations have been procured from the bowels by emollient and laxative injections; and that we ought to give orders for a full and free ventilation, and the use of suitable drinks.

But if it does sometimes happen that the movement of the horizontal fibres is inordinate, or in excess, it fortunately happens in the vast majority of cases that the powers of the longitudinal fibres are the greatest. The ovum being contained entirely within the uterus, it appears that it can only be expelled by the fundus approaching the os uteri; or, in other words, by the shortening of the womb that results from the contraction of its longitudinal fibres. Let us remember that the womb is attached to the upper end of the vagina, and that the ovum, in passing out from the uterus, must necessarily traverse that canal. It will then appear that the first contraction of the longitudinal fibres will tend to pull the circle of the os uteri open at the same time that the point of the ovum is insinuated into the enlarging orifice. This opening or dilatation of the orifice does not take place without resistance, which is chiefly perceptible, however, in the early stages; for we find that while the fundus and body of the womb are vigorously condensed during a pain, the cervix also is strongly contracted, but less and less vigorously as the dilatation becomes more considerable; so that, indeed, it is not rare, at length, to perceive the whole circle of the cervix suddenly yield, as if without opposition, to the greater power of the longitudinal fibres. The circle of the os uteri is, as it were, pulled upwards, towards the fundus uteri, by the muscular expulsive powers; and indeed it seems to be stripped over the lower segment of the ovum, over the head, or over whatsoever presenting part. I have known the whole dilatation to take place during a natural sleep.

Some women require only a few pains to complete the dilatation, whereas others suffer hundreds of pains during several successive days, before the circular fibres are conquered by the protracted efforts of their antagonists, the expulsive ones.

From thirty-five to fifty pains are probably the average number felt by parturient women. If four hours be a mean of the duration of labor, then the woman will be likely to have pains at the rate of one every ten minutes for the first hour—which would be six pains. She would probably have ten pains in the second hour, fifteen in the third hour, and twenty pains in the fourth and last hour of the process—say, in all, about fifty pains.

While the generality of cases are so favorable, there are multitudes of women who have not more than three or four; whereas some of them suffer from the repetition of two hundred contractions, and even a greater number than that.

A considerable experience and trained habits of observation are necessary to enable a practitioner to prognosticate the moment of delivery, making up his judgment from the intensity of the pains of expulsion, as compared with those of opposition or retention. It is certain that no man, be his experience ever so great or his discrimination ever so acute, can with absolute certainty calculate upon the moment when any given labor shall be brought to a conclusion, since no one can absolutely predict what shall be the exact degree or intensity of any muscular force, which, as it is a vital operation, so it is dependent on causes beyond our foreknowledge or perfect control. Young and inexperienced practitioners ought, therefore, to be very late in announcing their prognostic of the end of labor, as to time.

I have remarked that, as the longitudinal fibres pull the os uteri open, the apex of the ovum is inserted into the aperture: with each succeeding pain additional portions of the ovum pass into the os uteri and through it, until at last, the fundus having approached very near the cervix, the whole of the ovum becomes excluded from the uterine cavity, after which the same longitudinal and horizontal fibres, meeting with no further considerable resistance, act in concert, and thereby reduce the womb down to a very small size. It returns, but slowly, to the non-gravid condition. From fifteen to thirty days are required to effect this reduction. Let it be remembered that the womb is capable of contracting equally upon an ovum at term, and upon an abortion at three weeks.

The planes of the ischia are three and a half inches long. The womb is two and a quarter inches in length: when it occupies its proper place in the pelvis, the top of it is not so high as the top of the ischium; in other words, it is lower than the plane of the strait; but the point or os uteri sinks low down towards the bottom of the pelvis. The womb does not occupy the same place in the pelvis when the bladder is full that it does when that organ is empty; but retreats when the bladder is filling, and comes forward when it becomes empty again; hence the organ is scarcely ever at rest in the same place.

This movableness, and constant change of place, often result in the injury or weakening of its ligaments, particularly its round ligaments, which in some women become so much stretched by an over-fulness of the urinary bladder, that they fail to contract and so let the fundus uteri fall downwards into the hollow of the sacrum, until the womb is quite overset, backwards. This makes a case of retroversion of the womb.

When the womb is retroverted, and continues so for months or years, the os remains all the time close to the symphysis pubis; and at last the anterior column of the vagina condenses itself so as to accommodate its length to the actual short distance from the cervix to the symphysis.

If it be reposited, and an attempt be made by means of a common pessary to restrain it from falling over again, the attempt frequently fails and the instrument falls into discredit. The cause of the failure is in fact in the contracted, condensed, elastic anterior column of the vagina, which slowly, but surely, pulls the cervix over the top of the pessary, to bring the os back again close to the symphysis; and then the anterior column having come to a state of rest, as to its contractility, there is room enough to allow the fundus to sink again into the recto-vaginal, or Douglass' *cul-de-sac.*

In old cases, therefore, the ordinary pessary will not answer; but they are always curable by means of a ring pessary, of proper construction; for, when the posterior segment of such a ring is lodged in the posterior *cul-de-sac* of the vagina, and the anterior segment behind the symphysis, it is clear the os cannot come forwards again, nor the fundus fall down behind.

CHAPTER V.

THE OVARIES.

The ovaries are organs for the preparation of ova, or eggs, which contain the germ of the offspring.

In the mammals, there are two ovaries, within each of which may be seen, with a good lens, from twelve to fifteen eggs, or yolks, enclosed within their proper capsules or ovisacs, which are commonly called Graafian follicles, or ovarian follicles. They were some time since denominated Graafian ova—because De Graaf imagined that these pellucid bullæ were the ova of the animals in which they were seen by him. Let the Student early make the discrimination between the follicle, the cell, or ovisac which contains the egg, and the minute egg itself, which is too small to be readily seen by the naked eye.

The human ovary is about an inch in length, half an inch in depth, and more than a quarter of an inch thick; in shape, it is like a flattened olive.

Each ovary is attached to an angle of the womb—one on the right, and the other on the left. It is connected with the uterus by a short footstalk of a fibrous structure, which is called the ligament of the ovary.

The ovaries lie behind the Fallopian tubes, enclosed in a duplicature of the peritoneum, that adheres firmly to the proper covering or coat of the organ; so that the ovary is invested by a serous membrane or indusium, as the liver, stomach, or intestines are.

Underneath the serous covering lies the strong white fibrous coat, or tunica albuginea, which is a closed sac containing the stroma, the peculiar tissue of the organ. There is thus no proper excretory duct for this organ; nevertheless, the Fallopian tube becomes, upon occasions, the vector of its product. The connection of the vector tube with the organ exists, in all probability, only during the few moments of the sexual excitement, or orgasm. In the embryo, however, as late as the sixth month, the end of the Fallopian tube is permanently attached to the ovarium—before the seventh month, the connection is broken. See Rosenmuller, *Quædam de Ovariis Embryonum et Fœtuum Humanorum*, p. 11.

I have a specimen of fœtus at the sixth month, in which the detachment has not taken place.

The stroma of the ovary, with which the closed sac of the albuginea is filled, is a peculiar concrete, consisting, apparently, of a rather dense cellular tela, of a salmon-color. Throughout the stroma are to be seen numerous delicate arterioles and venules, that are the distal branches of the ovaric artery. It is worthy of observation, that the blood of this circulation is brought from a great distance, since the ovaric artery arises for one side from the emulgent, and for the other from the aorta itself. As the ovaries, like the testicles in the male, are originally formed high up in the abdomen, near the kidneys, an economical purpose was answered by deriving their circulation from these sources. Whether there be any further and peculiar economical end to be attained by drawing this blood from such a distant point, remains unexplained.

If the tunica albuginea of an ovary be divided with a scalpel, the stroma may then be readily torn asunder by pulling the edges of the incision apart with the fingers.

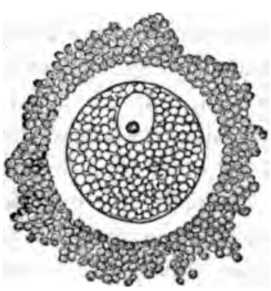
The ovary of a mammal, when examined for the purpose, exhibits several watery vesicles, whose translucency renders them visible through the indusia or coats of the organ. By cutting the ovary open, and carefully dissecting them out, these vesicles or bullæ may be completely freed from all attachment, when they appear as globules filled with water, and of sizes varying from the bigness of a garden pea to that of a small bird-shot. In each ovary may be counted some fifteen of these vesicles.

These Graafian vesicles—for so they are usually denominated—are also called Graafian follicles, Graafian cells, Graafian ova, and ovarian follicles. They are ovisacs. They are composed of a double membrane, one inside of the other. The outer or largest one, is united to the smaller or inner one, by a very delicate cellular bond, or magma, which, if infiltrated, serves to compress and crush the inner, while it distends and expands the outer coat or sac. Hence, if the outer sac should thus be greatly enlarged, the inner one would at the same time be crimped or corrugated, so as to give to the inner surface a convoluted appearance.

If a Graafian vesicle be punctured with a lancet, there spirts out, through the cut, a drop of water. This drop of water, when collected on a glass or knife-blade, and placed under the microscope, is found to consist of a pellucid liquor, in which swim a great number of small grains. Among these grains there is a portion or acervulus, in which the grains are agglomerated in greater number, and, in the midst of these, a yelk-ball is found.

Figure 44 represents this yelk-ball, bounded by a white, transparent zone, which is called its zona pellucida. It is a perfect sphere, filled with vitellary corpuscles, oil globules, and puncta that swim in a transparent liquor. The sphere or yelk-ball lies amidst the cumulus of granules before mentioned, as may be seen in the figure, taken from Rudolph Wagner's *Prodromus*.

Fig. 44.



It is outside of, or beyond the white zone or zona pellucida, that are to be seen the smaller granules of the cumulus or acervulus, so that the ovum above represented is bounded by the transparent or white zone. These outside granules are some remains of the granular membrane that lines the inner concentric membrane of the Graafian follicle.

Perhaps the physiologists go too far in calling it a granular membrane. It consists of innumerable grains that settle themselves, touching each other, upon the inner wall of the vesicle, like sediment in a vial. I do not deny that they deposit themselves thus under the forces of a vital affinity, and it is even probable that they do so; but whenever the vesicle is punctured, this so-called membrane becomes decomposed, and floats out as loose grains along with the yelk-ball; great multitudes of them adhering to it; many being entirely disconnected, while some of them stick together in laminæ, or clusters, or acervuli.

This granular membrane, or tunica granulosa, is thickest, in general, at that segment of the Graafian vesicle which is nearest the surface of the albuginea, and there it forms a small heap—an acervulus or cumulus, which has been by Baer called the cumulus proligerus or discus proligerus. It is in the apex of this cumulus or cone that the egg is found, and it is generally among the debris of this acervulus that the microscope reveals the yelk, with its bright pellucid zone.

Upon referring again to the above figure, the Student will see that in the yelk-ball, amidst its vitellary corpuscles, there is pictured a clear, transparent, oval vesiçle, with a dark spot upon it. This is the germinal vesicle, sometimes called Purkinjean vesicle, and the dark spot is the germinal spot, or macula germinativa, of Rudolph Wagner, which M. Coste calls the *tache embryonaire*.

Such, in general terms, is the human ovary, which, I repeat, consists of a closed sac, filled with ovarian stroma, in which are developed ova within ovisacs usually called Graafian follicles. These ova are true yelks, about one-fifteenth of a line in diameter. In each unfecundated yelk is a germinal vesicle one-sixtieth of a Paris line in diameter, and having upon its inner surface a germinal spot consisting of dark granules—the germinal spot being one-two-hundredth or one-three-hundredth of a line in diameter.

I have many times observed the numerous granules, or dark puncta, that may be inspected by placing thin slices of ovary on the field of a microscope. There are immense numbers of these points, which are, by some, supposed to be nuclei, or cytoblasts—the inchoate elements of ovarian ova. Such is the opinion of Martin Barry, who gives, in his papers, published in the *London Phil. Trans.*, drawings of these appearances in the ova of various animals. Gerber's anatomy also contains a plate representing this microscopic view.

If this notion be indeed founded in truth, then each ovary should be held to contain, not fifteen ova only, but the nuclei of hundreds of thousands of them.

Perhaps, however, the microscopic view is not correct, and these points are acini of the gland, if the ovary is a gland. Supposing them to be acini, and that an acinus may, by some physiological act, be cast off from its connection with the stroma that produced it, and carry away with it, like an inoculated bud or like a spore, or a pollen grain, the metabolic and the plastic forces—by which to develop the ovarian ovule—still we have, in either case, the idea of a reproductiveness in creatures beyond imagination for copiousness.

The ovaries are abundantly supplied with nerves, derived (*Longet*, t. ii., 543) from three or four branches that come off from the renal plexus, and proceed, in company with the ovaric artery, to the place of distribution. They are called the ovaric plexus, and spend their terminal fibrils within the ovary, and in part, also, upon the uterus, thus connecting the two organs in a common bond of sympathies.

Regner de Graaf, of Delft, in Holland, where he died at the age of thirty-two years, on the 17th of August, 1673, published his work *De Mulierum Organis Generationi Inservientibus* in 1672, and gave, as I have said, his name to the ovarian vesicles, or ovi-capsules. They were by him considered to be ova, and were long, and even until lately, by many, regarded as ova; for no one, until recently, had acquired any correct notions of the ovum of the mammifera.

At p. 181, he says, "In cuniculis autem, leporibus, canibus, porcis, ovibus, vaccis et reliquis animalibus à nobis dissectis, ea vesicularum ad instar, ut in avibus ovorum germina solent, sese dissecantium oculis exhibent; quæ in Testiculorum superficie existentia, communem tunicam hinc inde sublevant, atque ita per eam aliquando transparent ac si brevi exitum minarentur." His 15th plate represents the follicles as "ova." They are not ova, but merely ovisacs.

It is a title to immortality in the Republic of Letters, to have discovered the ovum of the mammal, and there has been a great contention as to the priority in this claim. It appears to me that, although one person may have first seen the object, so many individuals have been concerned in establishing and explaining the natural history and physiology of the fact, by laborious researches and patient efforts of reason, that no single person should be deemed entitled to all the credit: and it is certain, that the world is too much indebted to divers persons on this account, not to divide the honors of the career among many claimants. I feel no inclination to enter the lists of this controversy in favor of any particular person, in which I have no other than a common interest of gratitude to all the ingenious philosophers who have illumined my therapeutical path with floods of radiant light, freeing me from the errors and gropings of my blind predecessors, and enabling me clearly to perceive, and plainly understand many mysteries of physiology and therapeutics that were utterly hid from their eyes.

But the Student of medicine ought to be somewhat acquainted with the literary history of the subject, lest he wander among authorities that have now ceased to have any claim to his obedience. Let him, therefore, understand that a meeting was held at Breslau, in Silesia, in the year 1825, in honor of the fiftieth year of the Doctorate of Professor Blumenbach. At that meeting was presented a volume under the following title: *Joan. Fried. Blumenbachio, etc. Summorum in Medicina honorum semisæcularia gratulatur ordo medicorum Vratislaventium, interprete Joanne Ev. Purkinje. P. P. O. Subjectæ sunt symbolæ ad ovi avium historiam ante incubationem: cum duobus lithographis. Vratislaviæ, Typis Universitatis.* This volume was printed in September, 1825, but was not published, being designed only for private distribution. An edition of it was afterwards published for sale at Leipsic, in 1830, 4to., of which a copy is now before me. I look upon Professor Purkinje's book as the first in the series of the works of reform as to our knowledge of the ovaria. This is the work in which was first made known the existence of the germinal vesicle, commonly called the Purkinjean vesicle of the bird's egg.

Professor Purkinje had interested himself in the investigation of the cicatricula, or tread of the hen's egg. He was examining it in a vessel of water, in order to learn the nature of the cumulus that lies directly underneath the cicatricula, and of which Figure 45 is a representation.

Fig. 45.

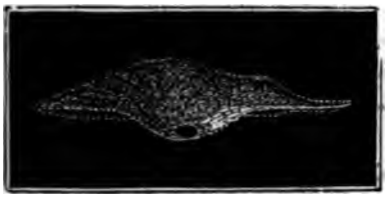
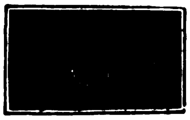


Fig. 46.

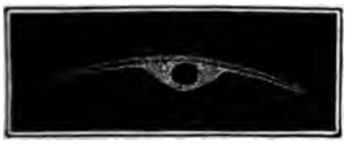


It has been very beautifully produced on wood by Mr. Gihon, from the original lithograph.

While, with a pair of dissecting needles, tearing the yelk asunder under water, and removing the broken-down masses with a pipette, he came upon a "most beautiful vesicle," partly adhering to the margin of the pore in the apex of the cumulus, and partly detached from its bed therein. His own words are: "Hæc dum lente ope perlustro, vesicula formosissima parte margini pori adhærens, parte libera haud parum mirabundo mihi offertur." Figure 46 exhibits this appearance.

The cavity in which this Purkinjean, or germinal vesicle (the first that was ever seen), is contained, is represented by Purkinje as in the annexed cut, Fig. 47, also copied from his lithograph. It is a cross section of a portion of the yelk-ball and the cumulus, with its cavity, in the hollow of which was found the Purkinjean vesicle. The transparent vesicle thus revealed is almost as delicate in its structure as a soap bubble. It can be found only in eggs that have not been fecundated, such as the pullet's egg, or yelks taken out of the ovary, in which, according to Von Baer, it exists, even in the very smallest yelks. Fecundation abolishes it.

Fig. 47.



The Student now has a clear understanding as to the germinal or Purkinjean vesicle, discovered and made known in September, 1825. This Purkinjean vesicle is the germinal vesicle that is found inside of the unfecundated yolk, whether of birds or women or other animals.

The next publication in the order of important discovery, was the *De Ovi Mammalium et Hominis Genesi. Epistolam ad Academiam Imperialem scientiarum Petropolitanam, dedit Carolus Ernestus A. Baer. Zoologiæ Prof. Publ. ord. Regiomontanus, cum Tabula Aenea.* Lips. 1827, 4to.

Such is the title of Von Baer's letter to the Imperial Academy of Sciences at St. Petersburg, on the subject of the ovum of the mammiferous quadrupeds.

In Von Baer's experiments, he, like Purkinje, never could find the vesicle in eggs already laid, but always detected it in even the smallest yelks of the egg bag. He supposes it to be the nucleus around which the matter of the yelk becomes subsequently aggregated. This was the case also in the molluscs, in the lumbricus and in the leech. These researches led him to the discovery of the mammiferous ovulum, in the following manner.

Having observed a very minute ovulum in the Fallopian tube of the bitch, and reflecting that such *small* ova could not consist of Graafian vesicles, which are much larger, and that the liquor of the Graafian vesicle could not so soon acquire the firmness and solidity of the tubal specimen, he was led by curiosity, rather than by the hope of seeing with the naked eye, through the several coats of the Graafian vesicles, any ovula in the ovaries, to open one of the follicles with his scalpel, and placing the fluid that came forth upon the platine of his microscope: "Obstupui," says he, "profecto, cum ovulum ex tubis jam cognitum, tam clare viderem, ut cœcus vix negaret. Mirum sane et inexpectatum, rem tam pertinacitur quæsitam, ad nauseam usque in quocunque compendio physiologico uti inextricabilem tractatum, tam facillimo negotio ante oculos poni posse." P. 12. He informs us that this ovulum may, in some specimens of the ovary, be seen through the coats of the ovi-capsule.

Everybody seems willing to concede to Von Baer the honor of this discovery, which was effected two years later than that of Purkinje, viz., in 1827. But, notwithstanding his good fortune as the discoverer, he is not the true expositor of its nature, for he mistook the ovulum or yelk for the Purkinjean vesicle, and he says: "Demonstrabo enim mammalium ova vesiculis Purkinji reliquorum animalium comparandas esse, quas in animalibus nonnullis, molluscis, acepalis v. c. et lumbricis ovorum evolutionem antecedere clare me vidisse puto,"—that is to say, "he will show that the mammal ovum is to be compared with the Purkinjean vesicle in other animals, and that the evolution of it precedes that of the ova in certain molluscous creatures, as he supposes to be verified by his observations."

At p. 32, he argues the identity of the nature of the Graafian ova, and the ova of birds and spiders, which have a great quantity of vitelline corpuscles and but little liquid, while the Graafian ova bear but few corpuscles and much albuminous fluid. "Besides, they resemble eggs in possessing a vesicle situated in a cumulus, and surrounded with a proligerous layer. *Therefore*, a Graafian vesicle, in view of the ovary, and in general, of the maternal constitution, is the true ovum of the mammal. 'Vesicula ergo Graafiana cum ad ovarium generatimque ad corpus maternum respiciamus, ovum sane est mammalium.'" Von Baer, notwithstanding the tyranny of the schools, almost saw the real truth; for he remarks upon the fact, that the whole Graafian ovum cannot, as in birds, be transferred to the vector tube. "Hence in mammals," says he, "the inner vesicle (the true ovum) contains a richer vitellary matter, and as to the evolution of the fœtus, it certainly proves itself to be a true ovum." In saying this, he was nearly free from the shackles of his scholastic prejudice. They were strong enough, however, to cause him to write of the ovulum, "Ovum fetale dici possit in ovo materno. Mammalia ergo habent ovum in ovo; aut si hac dicendi formula uti licet, ovum in secunda potentia."

The Student, in reading the above, will candidly admit Von Baer's claims, though he will perceive how checked he was by the bonds of an old way of thinking. After all, the egg within an egg was, in his eyes, the true, separate, independent yelk-ball of the mammal.

The ovum of the bitch is $\frac{1}{20}$th to $\frac{1}{30}$th of a Paris line in diameter, according to Von Baer.

Now, notwithstanding M. Von Baer, as by the foregoing appears, is the discoverer of the mammal ovum, it is not doubted that Messrs. Prevost and Dumas had seen it in 1825—the year in which Purkinje detected the germinal vesicle. They, on two occasions, turned out and saw the ovulum of the Graafian ovi-capsule in the rabbit. Yet, the glory is Von Baer's.

As to the history of the Purkinjean vesicle in the mammal ovule, it appears now to be settled that the honor of its discovery belongs to Professor Coste of the College of France, though several Germans have attributed it also to Von Baer.

M. Coste, in his *Histoire Générale et Particulière du Développement des Corps Organisés*, says:—

"I was at first accused of having copied M. Baer; but, inasmuch as the opinions I had set forth were diametrically opposed to those of that great physiologist, the public early did justice to a reproach so unfounded, and the improper criticisms of Mr. Robert Froriep were promptly repelled by Bernhardt himself, in his inaugural thesis, ***Symbolæ ad Ovi Historiam***, p. 25. This reproach having been set aside, an attempt was next made to bestow upon others the credit it was impossible to assign to M. Von Baer. It was pretended that the discovery was made at the same time, *or nearly at the same time*, by M. Coste in France, M. Bernhardt in Germany, and Mr. T. Wharton Jones in England. As to M. Bernhardt, it is enough for me to refer to that author's preface, in which he declares that his experiments were instituted for the purpose of ascertaining the correctness of my observations. Mr. Jones's publication is later by one year than mine; a statement that might suffice for the present occasion, were it not that that physiologist has himself fully recognized my rights as to the priority of discovery, in his report on Ovology in the ***Brit. and For. Med. Review***, No. 32, 1843, a paper in which he lays no claim to it himself, but attributes it to me."

Thus far M. Coste, whose remark as to Bernhardt's preface is correct, as well as his citation of Mr. Jones's paper.

Mr. T. Wharton Jones's words are as follows:—

"By the discovery of the germinal vesicle, in the mammiferous ovarian ovum, the complete analogy between the latter and the ovarian ovum of the bird, &c., was established; and Baer's error regarding it dissipated. The correct view of the matter had been suspected by Purkinje, but he and Valentin had in vain searched for a germinal vesicle, and it was only on renewing their investigations, after the announcement that such a vesicle had been discovered in the rabbit's ovum by M. Coste, that they, Wagner, and others in Germany, were successful in finding it. M. Coste, therefore, as Bischoff observes, must, notwithstanding his very imperfect description and delineation of the germinal vesicle, be considered as its first discoverer."

This, it appears to me, is enough to enable the Student to see clearly the whole case; and I shall not further cite M. Coste, in his warm reclamations against M. Bischoff of Giessen.

It is much to be regretted that, amidst the tranquil pursuits of letters and philosophy, there should arise occasions for reproach—the more, as so much honor always remains to be shared by the diligent members of the Republic. The world is very ready to acknowledge the services and merits of all those wise, learned, and good men, who, like Purkinje, Baer, Coste, Wagner, Jones, Pouchet, and Bischoff, have in their publications endowed mankind with an impayable benefit.

The discovery of the mammal ovum was rendered complete by the detection, in 1830, of the macula germinativa or germinal spot.

It is diversely attributed to Professor Rudolph Wagner and Mr. T. Wharton Jones; and it may be esteemed a conceded point, that it was cotemporaneously observed, as it was cotemporaneously described, by those gentlemen in Germany and in England.

The germinal spot is, by Wagner, in his *Prodromus Historiæ Generationis Hominis atque Animalium*, page 4, called *primitive Keimschicht*, and *maculæ germinativæ*. Professor Wagner, in a note, page 44, Part I., *Elements of Physiology*, says:—

"I was myself the first to discover the germinal macula. I also described and figured the whole ovum in its successive stages with greater care and sequence than had yet been done."

Wharton Jones says: "At one side of the germinal vesicle there is a small, round, dark spot, discovered and described cotemporaneously by Rudolph Wagner and the author of this report." *Brit. and For. Med. Review*, 1843, p. 517.

The germinal spot is from one-two-hundredth to one-three-hundredth of a Paris line in diameter. It consists of a collection of grains.—Wagner's words, *Prodromus*, p. 4, are: "If the germinal vesicle in man, and in the mammifers, be carefully examined with the microscope, at four hundred or five hundred diameters, there will be seen, in one part of the vesicle, a dark, round spot."

In this way he found it in mammals, birds, scaly amphibia, cartilaginous fishes, arachnoids, certain crustaceans, all mollusks, conchaceans, echinoderms, medusans, and polyps. Upon a more minute examination under still higher powers, there is seen a compressed orbicular stratum of a lenticular shape, composed of minute molecules, closely agglutinated in form of an acervulus, &c. &c.

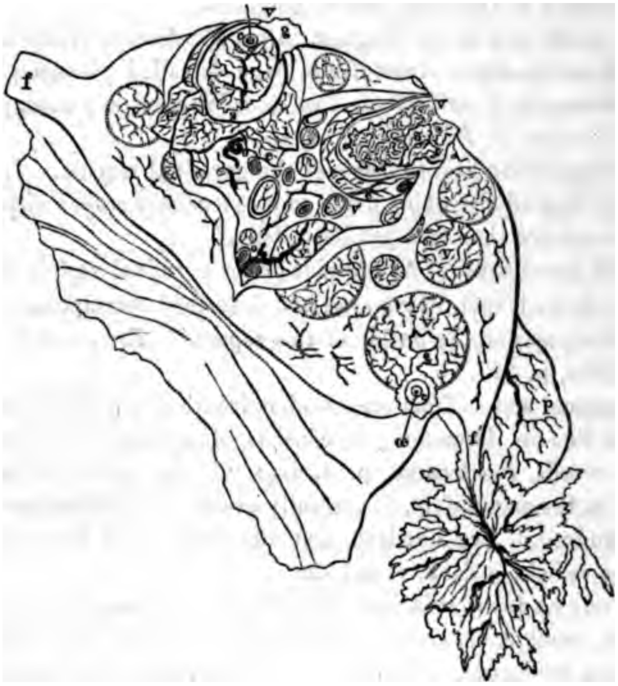
This granulous germinal stratum appears to Wagner to be the true living animal germ, existing antecedently to the act of impregnation. "*Hoc stratum granulosum germinativum, germen animale verum et vivum* jam ante prægnationem præformatum esse videtur."

Having now laid before the Student this account of the ovary, I shall annex a copy of M. Coste's magnified view of the ovarium from his grand atlas. In that superb plate, the figure is ten inches in its greatest diameter. Mr. Gihon has reduced it to this size. It was necessary to make it not more than four inches in diameter.

M. Coste's intention was not merely to exhibit the shape of the ovary greatly magnified, but to show the internal structure of it, and the various phases of the ovarian ova and their ovi-capsules, during their maturation, and the dehiscence and evacuation of the follicles. It is the left ovarium that is represented. The expanded fimbria *p*, of the

Fallopian tube *p*, is seen at the lower and right extremity of the drawing. Near this angle is seen a Graafian follicle *v*, the dehiscence or rupture of which has allowed a yelk, surrounded by its proligerous disk or cumulus, to escape. The opening has taken place through the tunica albuginea and the peritoneal coat, and the ovule marked *œ*, is still resting upon the exterior surface. Just above it is seen another less mature vesicle *v*, and a still smaller one above that—while farther to the left is a very small one. The line of incision passes, near its lower angle, across a pretty large and superficial follicle, one-half of which is seen through the coats of the ovary, while the other half is quite uncovered by the dissection which has laid the organ open to view. To the right and upwards from this point is seen an emptied Graafian cell *v*, in which *e* is the outer surface of the whole cell. At *v* is the point of dehiscence, through which the egg escaped. This Graafian cell consisted of two coats or membranes, one contained within the other. The broken laciniæ of the double ovisac are seen at the upper end, near the margin of dehiscence, where they are marked *g* and *i*. These two coats are better represented in the follicle at the upper and left extremity of the cut—in which their floating and distinct membranes are

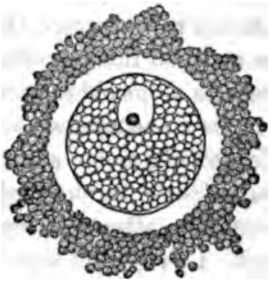
Fig. 48.



seen at *e* and at *i*, whereas *g* indicates the granular deposits upon the inside of the follicle, which is called the tunica granulosa—or granular membrane. This granular membrane is so little tenacious, that, upon puncturing and compressing a cell, it flows out with the water, and appears upon the microscope as a collection of innumerable grains, that are probably cytoblasts. Very near the superficial segment of this ovarian ovisac is seen the ovulum enclosed within its proligerous cumulus.

In order that the Student may here have a more complete idea of the ovary, I repeat the figure of the human egg, taken from Rudolph Wagner's *Prodromus Histor. Generationis*, in which is seen the pellucid ring, surrounding and enclosing a quantity of yelk corpuscles, among which, near the top, rests a transparent vesicle with a dark spot upon it. The pellucid ring is the zona pellucida of the egg, outside of which is a quantity of granular membrane that always comes out of the Graafian follicle sticking to the pellucid zone. It is necessary to remark that this figure is greatly magnified, for a very strong sight is required to enable any one to see without a lens the egglet, whose diameter is but the twentieth of a Paris line. The grains inside of the pellucid zone are grains of yelk—or vitellary corpuscles. They are yelk, true yelk, like that of the bird's egg. The oval transparent vesicle within them is the germinal vesicle, and the dark spot upon that vesicle is the macula germinativa—tache embryonaire—or germinal spot.

Fig. 49.



If the Student will look upon the germinal spot as the nucleolus, the germinal vesicle as the nucleus, and the vitellary membrane as the cell, he will have an idea of a true independent cell, possessing the metabolic and plastic forces that can enable it to develop itself wherever the proper cytoblastema, or pabulum, is afforded to it for that purpose—*i. e.* in the ovary, the tube, the abdomen, or the womb.

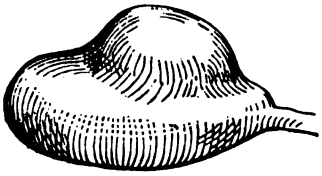
The production within the ovary of an ovum containing within it a germ possessing, after its fecundation by the male, the power of evolution solely in the direction and dimensions of its own genus and species, is one of the most mysterious and wonderful works of God; one well fitted to overwhelm the mind with astonishment, and to make us feel amazed at the vastness and the indispensableness of those forces that are communicated by a Divine power to the simple and microscopic elements of the macula germinativa.

Burdach, in his *Physiology*, t. i. 87, speaking of the tubular ovary in which the materials of yelks are secreted in the cavity of the ovaries, in order to become ova, presumes this to be the mode in which ova are formed in all the insects, in most of the inferior crustaceans, in worms, and in certain mollusks. "Moreover," says he, "there is not the least doubt that the substances of which the egg is composed, acquiring through the influence of the ovary their aptitude for a more elevated range of life, or already possessing it, tend partly also of themselves to take on a determinate form."

Is it a new creature that is formed out of the macula germinativa? is a question that has often been asked; or is it a propagation and continuation of the old or parent substance? M. Huschke proposes that the ovary is an aciniferous organ, and that the germs of the offspring are acini, which, under a physiological law, become deciduous, but carry away in their fall the vitality and accompanying forces that enable them to continue, after their separation, the pre-existing career of life development. I do not feel myself competent to speak with authority upon this proposition; I shall only state that very numerous and careful microscopic examinations of the ovarian stroma have not exhibited to me the evidences of the aciniferous nature of that substance; wherefore I am the more inclined to adopt the opinion of the cytoblast character of the germ point.

The Corpus Luteum.—Before I conclude my remarks upon the ovary, I ought to say something on the subject of the corpus luteum, a topic that has elicited an immense amount of discussion, and which still perhaps remains a *vexata questio*. Perhaps the principal interest that society has in the settlement of this question is one of a medico-legal nature; for although inquiries in this direction, of a medico-legal character, have not, so far as I am aware, led to any judicial decisions, I can conceive that important rights and interests might depend before a tribunal upon the views to be held as to the nature and interpretation of that singular product.

Fig. 50.



The corpus luteum or yellow body is a peculiar substance found in the ovaries of animals that have lately passed through the rutting season, and in women that have lately been affected with their menstrua, or that have become pregnant. In some pregnant women, the corpus luteum is either very small, or not readily discernible. In others, it attains a large size. In the cow, the corpus luteum (*vide* Fig. 50) is sometimes half as large as the ovary. It has been regarded as a sure sign of fecundation. I regard it as a sign of a finished ovulation.

On the 18th December, 1846, I made to the American Philosophical Society a verbal communication, setting forth certain views I had entertained as to the vitellary nature of the corpus luteum; and on the 15th January I read a memoir upon the subject, which was published in the *Transactions*, 1847, p. 131. In that communication I stated that, since the date of my first verbal memoir, I had carefully made researches both with my Chevallier's microscope and by other methods, as to the comparative appearances of vitellary matter taken from the egg, and matter procured from fresh corpora lutea.

These renewed researches leave me very fully convinced that the yelk of eggs, and the yellow matter found in a corpus luteum, are of the same apparent structure, form, color, odor, coagulability, and refractive power.

Having placed a small quantity of yelk on the platine, and just before I had brought the object into the focus, I have been struck with the appearance of the transmitted light; a bright-yellow, which fills the whole tube of the instrument.

When I have, in like manner, placed a bit of fresh corpus luteum, of the cow or sheep, on the compressor, and have crushed it, by turning the screw, I have found the tube filled with the same tinted light, before obtaining the focus.

A portion of yelk placed beneath the objective, exhibits numerous granules, corpuscles containing a yellow fluid, and oil-globules, mixed with a quantity of punctiform bodies.

Upon turning the screw of the compressor on a small lump of corpus luteum, carefully dissected out from its indusium, there is seen to escape from the crushed mass a quantity of granules, corpuscles filled with yellow fluid, oil-globules, and punctiform bodies swimming in a pellucid liquor.

The appearances observed upon examining a portion of yelk and a portion of corpus luteum, are so similar that it would be difficult, I think, to discriminate between them, but for the exception, that along with the vitellary corpuscles and granules and globules of the yellow body, there will be found flocs of laminated cellular tela, blood-disks, and other detritus of the organ, destroyed by the compressor.

The transparent corpuscles transmit a yellow light, whether observed singly, or in clusters, or acervuli.

The same is true of the corpuscles of the yelk.

On crushing a bit of corpus luteum with the compressorium, there escapes much granular matter that accurately resembles the granules of the granular membrane, the proligerous disk, or the retinacula of the Graafian follicle. This is the case even when great precaution has been used to procure the bit from the outer superficies of the corpus luteum—avoiding to take any portion that might have touched the inner superficies of the crypt left by the escape of the ovulum.

The similarity in the appearances leads me to suppose an identity of nature and origin.

I think no person accustomed to the use of the microscope could detect any difference between the molecules pressed out of a bit of corpus luteum, and those that escape from a crushed mammiferous ovule, or the yelk of an egg, excepting the debris or detritus before mentioned, which is plainly referable to the destructive power of the compressorium.

I have so many times examined the mammiferous ovulum that I suppose myself quite competent to compare its contents with those of the corpus luteum, and with common yelk.

I hope I am entitled to say, that the coloring matter and the chief constituent bulk of a corpus luteum, is a true vitellary matter, deposited outside of the inner concentric spherule, or ovisac of the Graafian follicle.

For the proof of the truth of this opinion, I refer to the future observations of the micrographers, who will be able to confirm or to confute my statement.

There is not, so far as I know, any author who has taken this view of the constitution of the corpus luteum—though that substance has been the fruitful topic of elaborate research and hypothesis, owing to the interest connected with it both in a physiological and medico-legal relation.

Previous to the year 1825, when John Evangelista Purkinje fortunately discovered the germinal vesicle of the unfecundated egg; and down to the year 1827, when Ch. Ern. V. Baer detected the mammal ovum, whose germinal vesicle was detected by Coste; and the year 1830, when Rudolph Wagner ascertained the existence of the *Keim schicht*, or macula germinativa, all notions and opinions on the mammal ovum may be set down as naught—since the opinions of the learned are now based on the discoveries just mentioned, which have led to a complete revolution in many most important construings of physiological action, and therapeutical indication and treatment.

It would be bootless, therefore, to ask what the writers of an earlier date than 1825 may have supposed upon the subject of the corpus luteum.

Dr. Carpenter, John Müller, Thomas Schwann, Henle, and Huschke, have not hinted at the vitellary nature of the yellow body.

Dr. Henle, in his *Algemeine Anatomie*, says: "So weiss mann namentlich, wie die Gräfschen Bläschen, im folge der congestion welche den fruchtbaren beischlaf folgt, erst anschwellen und den platzen, wahrend sie zugleich von Blutt angefüllt werden, welches sie almahlig entfarbt, organisirt, und in eine narbensubstanz verwandelt, die zuleszt verschwindet."—P. 894.

In this paragraph, Dr. Henle attributes the swelling and the bursting of the Graafian follicle to the congestion attending a fecundation. He says the ruptured cell is filled with blood, which colors it, becomes organized, converted into a scar-like substance, and then, at length, disappears.

Dr. Huschke, in his Treatise on Splanchnology, elaborately, details the opinions of authors on the corpus luteum; but nowhere alludes to the vitellary nature of that body.

Dr. Gendrin, M. Maygrier, Dr. Robert Lee, Wharton Jones, M. Raciborski, Ollivier D'Angers, M. Pouchet, make no mention of it—though they all enter into details.

Dr. Montgomery, Dr. Swan, and, I think, Dr. Patterson, speak not of it.

M. Flourens, and M. Velpeau, and Dr. Moreau, omit all allusion to the vitellary structure of the substance.

Bernhardt, who was assisted in the construction of his *Symbolæ ad Ovi Mam. Hist. ante Prægnationem*, by Dr. Valentin, in which admired work is contained a complete deduction of the whole literature of the corpus luteum, alludes not to the idea.

Von Baer's celebrated letter, *De Ovi Mam. et Hominis Genesi*, says of the corpus luteum, at page 20, "Me judice, minime corpus novum est, sed stratum internum thecæ majus evolutum;" which expresses, with sufficient clearness, the opinions set forth in the rest of his paragraph.

Dr. Bischoff, of Heidelberg formerly, now of Giessen, in his *Entwickelungsgeschicte der Saugthiere und des Menschen*, says, at page 33:—

"Wenn mann die erste entwickelung des gelben Körpers, unmittelbar nach austritt des eies, bei Thieren beobachtet hat, so kann mann darüber nicht in zweifel seyn, dass die bildung seiner masse von den innern fläche des Graafschens Bläschens ausgeht. Da sich nun hier die aus zellen gebildete *membrana granulosa* befindet, da die zuerst als gelber Körper erkennbarre masse gleichfalls aus zellen besteht, so ist es wohl gewiss, das von einer starkeren entwickelung dieser zellen der *membrana granulosa*, die ich auch in der Peripherie des eies noch nachweisen werde, die bildung des gelben Körpers ausgeht."

From this passage, it seems that Dr. Bischoff is not far from discovering what I suppose myself to have discovered; I mean, the vitellary nature of the yellow body of the ovary.

It appears needless to make any further citation in this place.

I shall here offer the remark, that if the concave superficies of the ovisac, or inner concentric, is really charged with the office of producing or excreting the vitellary matter of the ovulum, which must be admitted, even if we allow to that body the metabolic and plastic cell-force, (for it must, at least, be the producer of the cytoblastem of the cell,) there is no very great difficulty in admitting that the convex or exterior superficies of the same membrane may exercise the same functions as the dominant of those elective affinities which must be supposed as to every vital excrete.

And such a supposition finds abundant support in the analogy of the organs; as, for example, in the periosteal and medullary membranes of bones; which, under certain circumstances, are known to alternate their functional force; the medullary membrane coming to be a depositor of phosphate of lime, instead of a remover; and the periosteum a remover, instead of being a depositor of phosphate, which is its normal office. This mutation of powers, as to the membranes of bone, has so clearly been described by M. Flourens, in his admirable paper on the production of bone and teeth, in the *Annales du Museum*, that it needs no comment.

But I am far from claiming this illustration for my view of the case, strong as I might deem it to be. It suffices for me to know that vitellary matter is germinal matter, germinal cytoblastem; and that the business of an ovary is to produce it—and nothing else in nature can produce it.

As to the microscopic results at which I have arrived, I have nothing more to do than tender them to the micrographers; and I should feel most happy if, these remarks meeting the eyes of Dr. Bischoff, or my kind friend, Dr. Pouchet, those gentlemen should deem them worthy of their attention, and confirmation or refutation. If they prove to be unfounded, I wish them to be confuted by better observers than I am.

As to some other points of resemblance between yelk and corpus luteum, I have now to observe, that boiled corpus luteum becomes hardened, like yelk boiled hard. It is, in like manner, friable and granular, leaving a yellow stain on paper, like the stain from boiled yelk.

Dr. Thomas Schwann found it evidently coagulated, granular, and friable, upon being boiled.

In order to ascertain its odor, I threw a portion of corpus luteum on a live coal;—it gave out a strong odor of roasted eggs.

Are the granules and corpuscles of the corpus luteum cytoblasts and cells?

I have not been able so clearly to make out their nuclei as to speak positively—I suppose them to be so. But Schwann, himself, who in one place seems to regard the nucleus as a *sine qua non* in cell-life, says, at page 204 of that most admirable and extraordinary volume the *Microscopische Untersuchungen*:—

"Die kernloser zellen, oder richtiger ausgedruckt, die zellen, in denen bisjetzt noch keine kerne beobachtet werden sind, kommen nur bei neideren pflanzen vor, und sind auch bei Thieren selten." Non-nucleated cells, or, more correctly speaking, cells in which nuclei have not as yet been detected, are found in the lower vegetables, and rarely also in animals. And he cites, as examples of the non-nucleated cell, the young cells within the old cells of the chorda dorsalis, the cells of the yelk of the bird's egg, &c. &c.

Be the non-nucleated vesicle a cell or not, it is very certain that the milk corpuscle, and, probably, the chyle corpuscle, are of that nature, —and no one can contemplate the amazing reproductive power of a cell or spore of the saccharomyces cerevisiæ, without admitting for it all the properties of the cell-force. It is to the last degree reproductive, as are also many of the filiform fungi, the muscardine, &c.

The question at last is, whether I have made a discovery interesting to the physiologist, the practitioner, and the jurisconsult.

If I am right in my opinions, it must be interesting.

As a *résumé*, I say that my views are based upon the fact that—

1. Equal masses of yelk and corpus luteum are equally yellow.

2. They alike fill the tube, before the focus is got, with a brilliant yellow light.

3. They alike consist of a pellucid fluid, in which float granules, corpuscles containing yellow fluid, oil-globules, and punctiform bodies.

4. These bodies, placed on the same platine, and diligently compared together, exhibit the same forms, size, tint, and refractive power.

5. Yelk, boiled hard, is granular and friable; it is coagulated by heat.

6. Corpus luteum, boiled, becomes hard, granular, and friable—it is coagulated by heat.

7. Both substances, raw or boiled, stain paper alike of a yellow color. This experiment was repeated after Bernhardt, who says: "Cujus pigmentum aurantiacum (cor. lut.), admotis digitis adhærescebat."—P. 39.

8. There is this difference: The crushed mass of corpus luteum contains patches of laminar cellular tela, detritus, and blood-disks, forced out by the compressorium; which cannot occur in the yelk, as that is contained within a vitellary membrane, in which its corpuscles are free; whereas, in the corpus luteum, they are confined by the delicate cellular substance lying betwixt the concentric laminæ of the Graafian follicle.

9. They refract alike.

10. Projected on a live coal, they alike give out the odor of roasted eggs.

While I, of course, derive this view from perceptions of my own senses only, I ought perhaps to take leave of it here, committing it to more capable observers, in order to know whether they perceive it as I do.

But, while I suppose that farther observations may probably confirm my views, I see no objection why I may not now offer some remarks, in the way of a rationale, upon the point in question, the more particularly, as I hitherto have relied only upon my own observations.

I therefore state that all living beings are results of the operation of a reproductive or generative force.

This is true both as to plants and animals; with the *possible* exception of certain fissiparous and gemmiparous creatures, as well as of certain sporiferous fungi, and some creatures of a higher scale, as the nais proboscidea, &c. I say of these, that they constitute a *possible* exception to the law of reproduction by germs. I do not say they are exceptions.

This reproductive force has the same relation to the conservation of the vegetable and animal genera, as the force of attraction has to the conservation of the brute masses of matter of the universe.

For it is obvious that, but for this force, all the genera would die out in a single generation, and yet it is apparent that nothing is more permanent than the genera, which extend from age to age, touching the beginning, the whole course, and the end of time. The existing genera are the same to-day as at the commencement of the present cosmic career, and are destined to be so until the last great cataclysm of the globe. M. Flourens, in his work on generation, makes use of the *mot*, the saying, *un être collectif*, a collective being, in speaking of the immutable permanence of a genus. This fine saying leads the mind at once to a view of the importance of the law of genesis by which so great an end is attained.

It would, perhaps, be superfluous to say that, but for the exercise of this force, all *morals* would be nullified and blotted out of the great scheme of Providence; for, should the genera fail or die out, the earth would become a desert; no flowers to bloom—no corn, nor wine, nor oil—no insect to sport in the sunbeam—no song of birds—no lowing of cattle—no voice of man to acknowledge, and praise, and give thanks to the Giver of every good and perfect gift. Thus the whole scheme of morals would cease and be terminated, leaving no witness here to the power of God, beyond the senseless play of the elective and gravitating attractions.

Is it not clear, then, that the laws of this great conservative force must be most important laws? Can such great forces have little or no concern with the regulation and co-ordination of the other life forces? I repeat, that for life they have the same importance as appertains to the laws of attraction for the physical bodies of the globe.

This force is the true development force, not for the germ only, but for the embryo, the fœtus, the child, the youth, and the man. He who shall know it truly, shall know the laws of life.

It is not only a genetic, but a generic force. It determines the form and dimensions of the members of the genera in an interminable succession of ages. No horrid passion, no wild lust, no insane desire, can contravene the irreversible law of the distinction of the species and genera—" each after its own kind,"—which, but for its provisions, would rush into chaotic confusion and mixture—whereas they are, in truth, trenchantly divided, and set apart from each other, and for ever maintained pure and unmixed.

This force—this amazing force, is concentrated and summed up in a special animal or vegetable tissue. Nothing in animals, save a vitelliferous tissue, can yield or give out this force. It is the endowment of the ovarian stroma. It is the peculiar life-property of that concrete, and of nothing else.

The stroma (Lager) of ovaries is a tissue developed and sustained by the combined agency of a spermatic or ovarian artery, and a spermatic nerve.

The spermatic nerves possess an intimate plexus and ganglionic relation to the spinal, the sympathetic, and the splanchnic systems of innervation—so that they are related, in fact, to all the organisms.

Under the dominant indicative influence of the spermatic nerve, the ovaric artery, by its branches and termini, deposits the materials of the concrete of the stroma, with all its parts and mechanism.

The general relation of the ovary to the whole of the innervations, while it enables it largely to influence them all, renders it liable to disturbance by their derangements. Its great influence is exhibited in pronouncing the single word sex, for the ovary is the sex of the woman—the abstract female. But if the ovary be her sex, then the whole peculiar physical, moral, and intellectual character of the female are derived from it, as their source and dominant—they are conformed to its wants, its powers, its offices—and often pathologically modified by its conditions.

The materials of development for all the organs are derived from the blood, which may, without violent misapplication of the metaphor, be said to exist in a multilocular cyst, of which the cellulæ are the different sanguiferous tubes and sinuses of the vascular system. It is everywhere the same, and presents in each of the organs the same liquor sanguinis, and disks—so that, although all development is at the expense of the blood, yet there is a constitutional, an esoteric nerve-force, by which to compel the elective attractions through whose power every living concrete is produced.

The physiologist knows that this esoteric force is nerve-force—and he will not deny that, for the development of both a general and special anatomic structure, it must possess what I desire to characterize as a generic force, else all development would be in spherical forms, and of the same constituent elements.

No power can so modify the generic force of the nerves and blood-vessels of the cephalic extremity of the inchoate embryotrophe as to protrude from it a pelvis or a foot. Nor could a leg be possibly developed in the place of a prehensile limb. Even in the quadrumana the law holds good.

A liver whose development depends on its nutritious artery and its nerves could by no means be formed at the caudal or cephalic pole of a mammal. It must always have its central position. No examples will be found of a lung placed below the diaphragm. Hence, I say, the law of generic development is a law applicable not to the creature only as a whole, but to each of its several constituent parts. The whole business of zoological classification depends upon this order.

This law not only operates during the embryonal, the fœtal, and the puberic development, but is in force throughout the whole duration of life, perpetually repairing the organs, and maintaining their *generic* forms, against the wasteful detritus of life, until the cessation of life.

The membrana germinativa of the ovum, which is probably R. Wagner's macula, (Keimschicht,) is an elliptical or circular disk. Let me repeat what I just now said, that no power could determine the production of the pelvic at the cephalic, or the cephalic at its pelvic segment; nor a leg from the thoracic, or of an arm from the iliac region of the disk. Hence it is true to say, that such disk is endowed at different parts of it with a generic force, operative only in that one sole direction. I say generic, since the idea is applicable to all animals whatever, and to all the parts of animals.

My motive for making the foregoing remarks is, that they might serve as an induction or basis as to the generic force of *ovaries*.

An ovary is developed by an ovaric arterial trunk and its branches, drawing the vital current from the aorta or the emulgent, and attended by the spermatic nerves, which I regard as reproductive nerves, and generic in their powers.

I say reproductive nerves, since their innervative force is devoted to the evolution of germs: no other nerve has such a mission: I say germs—perhaps I ought to say cytoblastem.

If Huschke's pretty idea, that each Graafian follicle is a cast-off acinus of the stroma, carrying away in its fall an endowment of vital force rendered complete and generic by active fecundation, should prove to be well founded, I see no escape from the attribution of this reproductive quality to the spermatic nerve.

But, without discussing the question of the aciniferous nature of the stroma, the same attribution of the nerve-power is right, even under the hypothesis of an independent cell-life—for a reproductive cell could not exist but for the vitellary cytoblastem provided by the stroma, which is a vitelliferous tissue, and only that. Nothing else is so. The nature of the cytoblastem must determine the differences of cells. The cytoblast of an oak germ is different from that of a cabbage germ, nor could they have the same cytoblastem.

But the sole office of an ovary is to produce or prepare germs—it is germiferous; and it is so by its power to form vitellary matter. No other combination or arrangement of animal materials can produce yelk or vitellus.

The complete germ is contained within a vitellary membrane—which is the boundary of the yelk. In the mammals, this yelk is microscopic. In the ostrich and the cassowary it is a very large ball, as it is in some of the larger ophidians, as in the coluber boæformis, &c.

The matured germ contained within a yelk is spontaneously and periodically extruded from the ovary, in order that it may be fairly exposed to the contact of the male fecundative element—which should be deemed impossible while it is buried within the recesses of the ovarium, covered by the double tunic of the follicle, and beneath both the fibrous and peritoneal indusium of the organ.

To effect this extrusion, this spontaneous oviposit, the inner concentric spherule of the follicle is compressed, by the deposition, on its external convex surface, of yelk grains, corpuscles, oil-globules, punctiform bodies, and pellucid fluid—the beginnings of the corpus luteum—which gives to the concave surface of the cell an appearance of corrugations or convolutions like those of the brain, and which, as they daily increase by the continued deposit of yelk matter on the exterior, constantly reduce the size of the interior dimensions of the follicle, urging its contents towards the least resisting point of the surface of the ovary, until, at length, the *porule* or *hila* being opened, by the dehiscence of the coverings or capsule, the ovulum escapes into the fimbria, or falls with the peritoneal sac.

After the escape of the ovulum, the yelk-producing force is not in all cases immediately exhausted; hence the growth of the corpus luteum continues for a term whose limit is not yet known.

It is a periodical exacerbation of biotic force that matures and opens the Graafian cell. When the process of completing a germ and expelling it has been finished, the exacerbation ceases sooner or later, and a new periodical exacerbation of this strange life-force—or germ-producing force—is devoted to the maturation and spontaneous oviposit of another ovulum, and so on in succession, during the menstruating life of the woman; at every successive pairing season of birds; and at the annual rutting time of the more considerable mammals, and in all the migratory fishes at stated times.

It surprises me to see that many able and distinguished writers still cling to the antiquated notions as to the ovaric fecundation, which M. Pouchet has shown to be an impossibility. It appears to me that my view of the vitellary composition of the corpus luteum, and the mechanical result of its accumulation in effecting the oviposit, ought to be received as satisfactory rationale of the germ-depositing function. The fecundation of germs is a mystery which I deem beyond human cognition—and likely ever to remain so. The inquiry into the corpus luteum is far more feasible and practicable. No woman can menstruate but coincidently with, and in consequence of, the oviposit. Every oviposit is followed by a corpus luteum, which is larger or smaller, according to circumstances. Many women have scarce discernible ones after conception—others have very large ones. The true and the false corpora lutea differ only in magnitude—not in their essential nature.

I have no doubts as to the essential identity of nature in the corpus luteum of pregnant women and that of the virgin—and am pleased to find that the author of that admirable work, "*Die Geburtskunde, mit einschluss der Lehre,*" etc. etc., Franz A. Kiewisch, entertains the same opinion. It is true that this author appears not as yet to have learned the reasons for supposing the corpus luteum to be a vitellary material, or, at least, that he has not accepted that rationale of the corpus luteum. Still, he is evidently a careful observer, as well as good thinker.—He says, p. 80, "Da diese Erscheinung bei der Lehre von der Schwangerschaft erst genauer erötert werden soll, so schicke ich hier fur die Bemerkung voraus, das die Follicularesté bei jungfräulichen Individuen, obgleich sie in der Regel sehr unbeträchtlich zu sein pflegen, doch dieselbe Bedeutung haben, wie die bei schwangern vorkommenden gelben Körpern, und dass ich in cingelnen scltenen Fällen auch bei nich geswhangerten Individuen bis zu Kirschengrosse entwickelte und gleichfalls exquisite gelbe Körper vorfand." Kiewisch says that the remains of the Graafian follicle, left after the ovulation in maidens, obey the same law that rules in the cases where conception has followed the ovulation—and where a true corpus luteum has been developed. He further says that, in some rare cases, he has found the exquisitely characterized *corpus luteum*, in the virgin, as large as a cherry.

In the first edition of this work published in 1847, my statement of the corpus luteum stands as in the foregoing, and I have purposely left the text up to this point unchanged.

The preceding pages may show how considerable a mass is that of the literature of the corpus luteum, and how varying are the opinions heretofore entertained upon that subject.

It was on the 18th December, 1846, that I read my paper on the corpus luteum, at a meeting of the American Philosophical Society, and that paper was ordered for publication in the *Transactions*.

Deeply convinced as I was that I had fallen on a true and demonstrable rationale of the corpus luteum, I was willing to wait for the decision of the learned as to the truth of my explanation. Some of the reviewers treated me with less than civility for my innovation; but I perceived that they had condemned me on a *primâ facie* examination, and that their opposition depended rather upon a usual reluctance to abandon opinions already adopted, than upon any improbability of the truthfulness of my statements of the subject.

Professor Coste, whose second part of his 1st vol., on the development of organic bodies, was published in the summer of 1849, has adopted my views as to the vitellary nature of the luteal body. M. Coste regards the inner membrane of the Graafian follicles, and not the magna reticulatum lying betwixt the inner and outer cell, as the seat of the deposit. It is a matter of small moment, this, though I by no means yield my opinion on the authority of even so great a name as his.

Having sent my paper, from the *American Philosophical Transactions* of the year 1847, to M. Coste, immediately upon its publication here, I cannot withhold the expression of the surprise with which I find him acknowledging the receipt of it, and at the same time saying (in 1849, two years later), that I have arrived at the same conclusions with himself on this subject; that is to say, he got my paper in 1847, and, adopting my exposition, says, in 1849, that I have attained to the same views as he there so elaborately sets forth.

In order that the American Student may have an opportunity to become acquainted with M. Coste's views, I here translate from his *Dev. des Corps Org.*, p. 251, the following passages:—

"Indeed, upon examining with the microscope the texture of the internal layer of the capsule a short time before the period of its rupture, we find that, besides its abundant vascular network, it is exclusively composed of small vesicles or cells each containing colourless molecular granules; but immediately after the dehiscence, they become so greatly developed that, when the convolutions fill up the cavity, they are found to be five or six times larger than they were at first. Hence it follows that the membrane whose wall they constitute must be proportionably thickened. It also becomes softer, and more friable, because they cease to cohere so strongly as at first, while the wall itself becomes softened. This is the reason why, at a certain period, the capsular convolutions acquire an encephaloid appearance, the result of a modification both of the constituent vesicles and their contents, as I shall proceed to show. In process of time, a stage is reached in which the disunion of the vesicles is so easily to be effected, that it may be done by merely scraping the capsule, which detaches nearly the whole of them, after which nothing is left save the naked vascular branches that run along every plait. I have made this preparation in several follicles previously injected, so as to be able to see the facts in the clearest manner, and as I have here described them.

"In proportion as the constituent vesicles enlarge, the contents are appreciably modified. In the cavity of each one of them is formed an innumerable quantity of molecular granules which renders them more and more opaque, and which under the slightest pressure pass out through the containing walls, that give way by laceration. These granules are remarkable, not only for their number, but also for the yellow tinge which slightly colors them. Now, as they are very abundant, and closely packed within the vesicles that contain them, it follows that the yellow tinge that is slight in the individual granules becomes very decided as for the whole mass of them. It appears that something takes place here like what occurs in the vitellus of the bird while taking on its yellow hue. I have indeed already said, while explaining the material conditions of this phenomenon, that it is produced by the crowding together of the granules with which the yelk corpuscles are gradually filled, and by the admixture of the oleaginous particles that are disseminated in it. The color of the corpus luteum seems to depend upon an analogous arrangement of the material contained in the voluminous vesicles that compose its mass," &c.

Let the Student do me the favor to compare this account by the learned Frenchman with that in the first edition of this work, and I feel sure he will do me the justice to admit the priority of my solution of this long-questioned problem.

I beg leave to make one more quotation, which is from M. Coste, p. 268: "Baer first understood the mechanism by means of which the plaits and convolutions are produced. Pouchet showed how they become thickened; and I think I can establish the fact that the color of them depends exclusively on the nature of the molecular granules or the globules with which the cells that form these walls are filled, and not at all, as supposed by Raciborski and Pouchet, on an extravasation of the coloring matter of the blood. I have observed with pleasure, in a pamphlet sent to me by Dr. Meigs, that, in the last respect, that observer had come to the same conclusion as my own."!! Prof. Coste should have said that he adopts Dr. Meigs's views in this last respect.

PART II.

THE PHYSIOLOGY OF REPRODUCTION.

CHAPTER VI.

MENSTRUATION.

WOMEN are subject to a discharge of blood from the genitalia, which returns very regularly once a month. This monthly periodicity of the bleeding has given it, among many people and languages, the name of *menses*, *menstrua*, *menstruation*, *catamenia*, *mois*, *monatliche*, *menstruaçion*, *mése*, &c. Among us, it is called *courses*, *periods*, *terms*, *monthlies*, *monthly sickness*, *unwell*, *times*, and a variety of other names, hints, and allusions, that need not be here summed up.

The discharge is not met with in children, unmarriageable girls, or old women. It appertains to women only as long as they are capable of conceiving. They cease to be child-bearers when they lose the power of menstruation.

The first appearance of it is commonly to be noticed among us at fifteen, but many are found to produce it at fourteen years, and some at thirteen and a half years of age. In general, women have ceased to menstruate after they have passed their forty-fifth year—yet there are vast numbers who continue to be menstrual until they attain the age of fifty years. It is rare for a healthy woman to cease menstruating before she is forty years old; some, however, cease at thirty-six.

I said that the catamenial discharge is blood. It amounts to from four to six fluidounces of blood at each term. This is the rule—the exceptions are, that some women do not eliminate more than one or two ounces each time, and that others never lose less than ten or even sixteen ounces of blood.

For the most part, as soon as the menses are perceived to begin to flow, the woman applies a T-bandage, consisting of a napkin, called the guard, folded like a cravat, which is pressed against the genitalia, while the ends are secured to a string or riband tied around the body above the hips; but I have seen some, not a few women, who assured me they had never used any other precaution than that of putting on a thicker petticoat for fear of the exposure of their condition. Such persons must be very slightly hemorrhagic, since the want of a guard-napkin would otherwise be sure to expose their condition by stains of blood upon their feet or stockings. Many female patients have assured me they never use less than a dozen napkins upon each catamenial occasion—and fifteen, and even twenty such *changes* are not very rare in the history of healthy menstruations. An ounce to a napkin is, perhaps, not an excessive computation.

Perhaps the Student will acquire the justest idea of the ordinary quantity, by settling it in his mind that four to six ounces is the most common rate for each normal menstruation.

It seems to be a very indifferent matter for the health of women, whether they menstruate copiously or not, provided each one is regulated according to the habits, wants, and normal forces of her own economy.

Each female, in menstruating, obeys the law of her own special system, and not that of another woman's system; hence, if she habitually loses four ounces, and is well, no attempt ought to be made to augment the amount of the discharge; since her four ounces are what she requires, and not twelve ounces. On the other hand, one who has for years lost twelve ounces at each menstrual return, might be deemed sick, in case she should dispense four ounces and no more.

Each catamenial period continues from three to five days; so that the subject is not free from it more than from twenty-three to twenty-five days at a time; but there are many examples to be met with in which the period of its duration is not less than seven or eight days for each menstruation. In the duration of the flow, as well as in the number of fluidounces discharged, each woman obeys a law of her own nature, and if that be fulfilled, her health is good as to the duration. The young physician should not, therefore, feel constrained to take in hand a case, because the number of menstruating days of his patient might be less than that of some other woman.

Much disputation has attended the investigation of the menstrua. Some writers aver that the discharge is a secretion, and not an effusion or hemorrhage—some declaring it to come from the veins, and others from the arteries of the uterus. At present, these disputes appear to be at an end. The valuable researches of Purkinje, Coste, Von Baer, Pouchet, Négrier, Bischoff, and others, have rendered it clear that the catamenial fluid is blood. Blood cannot be secreted.

The woman could as well secrete a liver, a muscle, or kidney as a blood-disk.

I am aware that the Student of Medicine, I mean the younger sort, will be apt to find himself, here, in a sea of doubts and perplexities arising from his respect for *authors;* for he will have studied some of the older books, from which he will have derived notions difficult to eradicate from a young mind in which they have taken deep root.

Let him refer to the article on the ovaria, where he will find that all that has been said upon the nature and causes of menstruation prior to the year 1825, is nonsense; and that our real information began to acquire some philosophical certitude from the moment of the discovery of Purkinje's vesicle, which cast so bright a dawn upon the nature and laws of reproduction; and that, by the labors of physiologists and naturalists since the said date, 1825, our dawn has grown to be a great shining light, under which things are clearly seen and understood that were formerly wholly unknown or imperfectly comprehended. In this department, then, let the Student turn to the moderns. It will be proper for him, in a more advanced scholarship, to learn what our predecessors erroneously deemed of this matter.

I repeat, then, that the menstrual fluid is blood; but it is impure blood—it is impure from the admixture of a quantity of mucus and epithelial scales.

It is rich in blood-globules, and in serum; and when it is abundant, hurrying itself rapidly from within the genital cavities, it is nearly pure blood. On the contrary, when it oozes slowly and tardily away, resting, perhaps, a long time in the cavity of the vagina, before the sphincter vaginæ allows it to escape, it becomes slimy from the plentiful addition of mucus to it. This is especially the case in such as have a vaginal leucorrhœa, or in those who have the albuminous leucorrhœa that is produced from the crypts and glandules of the canal of the neck of the womb.

The beautiful engravings given to us by M. Pouchet, in the Atlas of his *Théorie Positive*, are doubtless absolute, faithful representations of the microscopic view of the menstrual fluid. They ought to be conclusive in settling our opinions as to the nature of the genital discharge, not in women alone, but in many of the mammiferous quadrupeds.

It is not, however, in every one of the older authors that erroneous notions are to be met with as to the quality of the menstrual discharge.

To cite one distinguished example—Haller says: "Sanguis menstruus de sana, neque immunda fœmina, rubore, calore, odoris absentia, nihil ab alterius fœminæ sanguine differt. Lentorem aliquem possit mucus admistus addidisse."—*Physiologia*, lib. 28, sect. 3.

I may add here that Madame Boivin, whose knowledge of the whole topic was not inferior, perhaps, to that of any other writer, declares that it is blood like that from a vein. She says:—

"La qualité du sang des menstrues ne parait pas different de celui qui circule dans tout le système, lorsque la femme est saine, bien conformée, et qu'elle fait usage des moyens que la santé et la propreté exigent."—*Mad. Boivin, Art. des Acc.*, 105.

The few opportunities I have had of observing the appearances of the catamenial fluid, might seem insufficient to enable me to come to positive conclusions: since healthy women admit of no such investigation, and since the morbid specimens, which are the only ones submitted to us, are not to be considered as samples of what flows naturally. Madame Boivin's account is, therefore, more worthy to be relied upon than that of any physician whatever. Madame B. can speak of the normal, and the medical man can only have access to the observation of an abnormal state or character of the discharge.

The Student will pay greater respect to facts in making up his opinions than to any man's opinions. He is aware of the constitution of healthy blood, whose analysis is in one thousand parts—

Corpuscles	127
Albumen	80
Fibrine	3
Water	790
	1000

If such be the true results of analysis of the blood, and I take it that it is so, then let the Student compare it with the analysis of the fluid discharged by women in menstruation.

M. Brierre de Boismont, in his work on menstruation, at p. 172, gives this analysis by Denis of the menstruous fluid of a healthy person, aged twenty-seven years:—

Water	825.00
Globules	64.40
Albumen	48.30
Extractive matter	1.10
Fatty "	3.90
Saline "	12.00
Mucous "	45.30
	1000.00

Rindskopf (Simon's *Chemistry of Man*, 337) found the menstrual fluid to be acid, and composed of

Water	820.830
Solid residue	179.170
Salts	10.150

In a second analysis, he found

Water	822.892
Albumen and hæmato-globulin	156.457
Extractive matter and salts	20.651

Franz Simon's analysis was—

Water	785.000
Solid constituents	215.000
Fat	2.580
Albumen	76.540
Hæmato-globulin	120.400
Extractive and salts	8.600

Dr. Letheby (*London Lancet*, May 2, 1845) made an analysis of fluid detained by an imperforate hymen. It consisted of—

Water	857.4
Solid constituents	142.6
Fat	5.3
Albumen	69.4
Globules	49.1
Hæmatin	2.9
Salts	8.0
Extractive	6.7

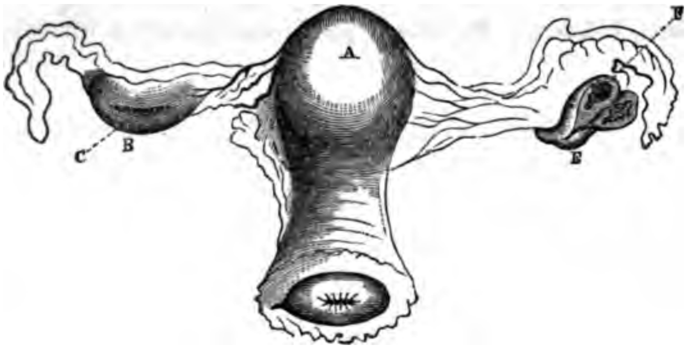
These analyses, I hope, may serve to convince the Student that the menstrual fluid is produced by effusion or extravasation, or hemorrhage, and not by an act of secretion. There can be no analogy between an act of secretion like that of the liver, kidney, or salivary gland, and a clear outflowing of pure blood of the capillary vessels, or other tubes that afford the outlets for such discharge. I repeat, that there can be no blood secreted.

The cause of menstruation is now, nearly on all hands, admitted to exist in the ovaries, and to be connected directly with the periodical evolution and discharge of the mature ovulum, a process denominated ovulation.

When a woman's body, who has perished while menstruating, or soon after the performance of that act, is examined by the anatomist, he always finds upon the surface of one of the ovaries a small bloody spot; sometimes as large as the head of a very small pin, and sometimes larger or smaller. If a delicate probe be pressed upon this bloody point, it sinks into the ovary, the point descending into a cavity which contains a minute clot of blood. This cavity is the emptied Graafian vesicle, from which the ovulum has made its escape by passing out through the bloody pore in the ovarium. The ovulum may be supposed to have fallen into the pelvis, where it is not to be seen, on account of its minuteness—being invisible to the naked eye. Its presence in the pelvis could not do any harm, if it were not fecundated. Perhaps, if it were fecundated, it might, by slitting up the Fallopian tube, be discovered in the canal of the tube, or it might be traced into the womb itself. The Student can readily find it in the cornu of the sheep's womb.

The cut that I subjoin is a good representation of the appearances above mentioned, in the ovaries of a young female who died eleven days after the commencement of her discharge. As she perished with a violent disease, it is possible that the healing or reparative processes may have been more tardy than they are in a healthy girl.

Fig. 51.



When the specimen was brought to me, I perceived the porule which had allowed the ovulum to escape, and I inserted a fine probe in it and down to the bottom of the crypt. The edges of the pore being cleansed, the aperture, it was evident, had been opened by absorption to allow the contents to escape. The whole of the circumjacent tissue was highly injected, as it is always found to be under such circumstances.

With a scalpel, I made an incision which split the pore, and sunk down to the bottom of the crypt, or emptied cell of De Graaf. In this crypt, I found a clot of blood, which filled it well.

Upon turning one of the flaps over, as in the figure, and after wiping the inner surfaces clean, the configuration of the lining membrane was visible.

It was convoluted like the convolutions of the brain; and the surface is always so convoluted, because the innermost concentric coat of the Graafian follicle is pressed inwards towards the centre of the spherule, by the growing deposit that takes place betwixt it and the outer coat.

The artist has endeavored to represent this appearance of the convolutions; and although he has done it well, yet it could not be expected that a wood engraving could as well represent such delicate modifications of surface as the finer touches of the copper-plate engraver.

To those who might desire to see this appearance as it really is, I recommend an inspection of the ovaries of the sow, or a reference to the exquisite colored engravings of Pouchet; particularly the figures 1 *a*; 2 *a*; 3 *a*; 6 and 7, of the Atlas to the *Théorie Positive.* The same plate, at figures 1 and 2, contains very just expressions of the appearance of the porules upon the surface of the ovarium, from whence the ovules make their escape.

Dr. J. Wallace brought me, three years since, the uterus and ovaria of a young female, who died suddenly while menstruating. In this specimen, I detected the bloody porule and the crypt beneath, filled with the coagulum. The cavity of the womb contained blood of the menses.

Let the reader refer again to the cut, Fig. 51, where he will find, upon the right ovary, the mark of an incision. I made that incision upon the centre of a late cicatrix, which I supposed to be the scar of the last antecedent menstruation. The cicatrix was complete, but upon cutting down through it, I came upon the cavity of the crypt, which still contained the remains of the old clot. This old clot had become, in a measure, granular and dryish.

There were other cicatrices of still older menstruations; and I doubt not that, if the young woman had had during her life forty menstruations, she had had forty cicatrices of the wounds or ruptures of the Graafian cells, through which the ova had escaped.

I do not mean to assert that an anatomist ought to be able to count, upon the ovaria of a subject, the number of menstruations, by counting the scars; for many of the succeeding ruptures must take place through old scars, thus confounding or blending them together. What I wish to express is, the opinion that a woman never does menstruate without rupturing a Graafian follicle and discharging an ovulum, and leaving a scar of the hila.

In the practice of physic, it is a common and egregious error to say a woman has her courses because she has a discharge of blood from the genitals. I am afraid that this mistake is so very common as to reflect no little discredit on us.

A woman may bleed from the womb as she may bleed from the lungs, the Schneiderian membrane, or the stomach; but she does not menstruate except she also performs the offices of the periodical ovulation; and in practice this distinction should never be overlooked, since it is wrong to attribute to the operation of a physiological law the results of a pathological state, and *vice versâ.*

From the foregoing, it appears that the doctrine, as to the cause of menstruation, is as follows:—

1. Up to the period of puberty, the ovaria do not contain any mature or ripe ovules.

2. At the completion of the puberic age, ovula are matured within the Graafian cells, and the woman continues to mature or ripen them as long as she continues susceptible of impregnation; that is to say, from the attainment of complete puberty, which is generally in the fifteenth year of her age, in this country, until the age of forty-five, or change of life.

3. The ova contained within the Graafian follicles are matured periodically—in women, once a month; in other animals, at stated intervals; in the larger animals, once a year; or even with still longer intervals, as in the elephant, and creatures that carry the young in the womb more than an entire year.

I need only advert to the universality of the law of periodicity as to the evolution or maturation of germs; and I do not find myself called upon to explain why there should be, in the economy of Providence, a law of periodicity for the great purposes of reproduction. It suffices to perceive that it could not have been otherwise, without introducing the greatest disorders among the living creatures under the dominion of that same all-wise Providence.

In the vegetable, as in the animal kingdom of Nature, we clearly perceive, on every hand, the wide-spread reign of this law; for we see the forests annually repeating the sexual act upon which their genera depend for a perpetual renewal. The grasses, and flowers, and fruit-trees raise this great annual hymn to show the continued will, power, and beneficence of God; and the whole of the insect tribes, the worms, the fishes, birds, and mammals, are under a perfect obedience to the same great force.

The influence of domesticity has, by Fred. Cuvier, been shown to have a power not dissimilar from the power of civilization, to modify, in some degree, the operation of the reproductive forces. Under this modifying force, we find certain of our domestic quadrupeds and birds to have lessened the duration of their reproductive intervals, but such instances ought not to change our convictions as to the universality, or of the necessity, of this strange periodicity. The modifying power of protection, of abundant and more nutritious food, of habit, &c., might well be supposed to add a greater vigor to the physical operations of our domestic creatures. There is no denying such influence for those portions of the Human race in which the arts of civilization, under the protection of wise and beneficent codes of law, permit the human form and forces to acquire their highest perfection.

As I have, in my *Letters to the Class*, treated, at considerable length, upon the evidences of the universality of the reproductive periodicity, I shall not repeat those details in this place, but beg leave to refer the Student to Letter XXVIII., p. 364.

I take it for granted, then, that the ovarium has power to mature one Graafian follicle at a time, during which process, the upper segment of the spherule rapidly rises above the surface of the ovary, becomes extremely thin, and finally opens by a delicate pore, through which the ovulum, or little yelk containing the ripened germ, escapes into the pelvis, or is carried down to the womb, after being ingurgitated by the infundibulum of the Fallopian tube. In those cases where the sexual orgasm takes place while the ovule is in the hila, or resting upon the surface of the ovary, the fimbria of the tube may seize, and the canal may absorb and convey it to the womb. Where no sexual orgasm exists, it must fall into the pelvis and be lost therein. We have no reason to suppose the infundibulum can explore the pelvic cavity and find the lost ovule. There is no just reason to suppose a state of erection of the vector tubes as a normal concomitant of the mensual excitement, as has been supposed. We know, on the contrary, that menstruating women are often languid and inapt to the sentiments that lead to the sexual indulgence or appetite. These reasons induce me to suppose that the ovulum does not pass into the Fallopian tube, except under the excitement of the coitus, or of orgasm provoked by illicit, and shameful contact.

4. During the whole menstrual life of women, extending from the fifteenth to the forty-fifth year of their age, the stroma of the ovaries,

which contains, perhaps, myriads of germ points, is ripening many Graafian follicles, and if those that are situated at considerable depth beneath the surface should be examined, we might find ourselves at a loss to know which, of a number of them, would be the first to be fully ripened.

As to those that have risen near to the surface, there might be less hesitation to point out the ripest one. They all grow, perhaps, *pari passû*, during the greater part of the inter-menstrual period, for we discover no signs of extraordinary activity in their evolution, except as the woman approaches the time for being taken unwell. As that time approaches, she exhibits the constitutional and local signs of increased sanguine determination to the organs within the pelvis. She has lumbar, and sacral, and sur-pubal pain, and fulness or tension, with heat or warmth and weight, all of which symptoms are relieved and carried away with the torrent of the menstrual hemorrhage, which is the bloody and external visible sign of the extraordinary vascular and nervous excitement of the internal genitalia. Which of the genitalia? Is it the uterus, or the ovary, that is the focus of this sanguine *tourbillon*?

In all ovaries containing mature follicles, whether of woman or of quadrupeds, that I have examined, I have noticed the undeniable evidences of increased vascular activity, as seen in the numerous arterioles and venules, as well as capillary tubes, in the immediate vicinity of the developing follicle. See the wood-cut Fig. 48, page 120, copied from Prof. Coste's atlas.

These circumstances lead me to the conviction, that the ripening ovulum, in the last days of its progress to perfection, is hurried through its processes by a violent, almost explosive augmentation of the physiological forces resident in the stroma. Such augmentation of biotic activity can come to it only through the nerves and blood-vessels of the part. But, seeing the potent, nay, the dominant influence upon a whole life-force, of the ovaria, whose stroma is the essence, in physics, of the female sexual nature, what wonder have we when we perceive that influence extending itself to the whole reproductive apparatus, and even to the whole moral and physical being? Is it not vigorous enough to excite the affluxion or molimen of the monthly hemorrhage? It is the periodical intensity of the ovaric force that, exciting the somatic energies in general, occasions the phenomena of menstruation.

5. During the last days of the developing of the ovarium ovulum, the vascular circulation and the nervous intensity of the organ are greatly augmented—a state which passes beyond the boundaries of the stroma

itself, and being propagated to the uterus and vagina, renders them also the seats of sanguine affluxion and engorgement.

Under such circumstances, the uterus increases in weight; it acquires a redder hue, is more sensitive, and sinks somewhat lower in the pelvis; probably the glandular tubular matter of its mucous body becomes greatly thickened, and the vascular network that is found among the tubuli highly engorged.

From such engorgement and affluxion it is delivered by means of the mensual hemorrhage, which escapes from the vessels on the inner aspect of the womb, falls into the vagina, and thence flows upon the outer surface of the external genitals; and it is called menses, catamenia, show, &c. &c. It is pure blood, mixed with uterine, tubal, and vaginal mucus, and epithelium. This blood perhaps escapes from normal orifices, periodically enlarged, dilated. M. Coste thinks it is from rupture of the thin coats of the superficial rete vasculosum, by what he calls *déchiquètures.*

Such is the doctrine of menstruation, a doctrine that resolves itself into one of local plethora or hyperæmia—which liberates the physician and the philosopher from the bonds of every ancient prejudice on the subject, and shines upon his therapeutical and chirurgical path with a light so strong and clear, that he need no longer stumble and grope amongst a chaos of vulgar, yet time-honored opinions and methods.

It is difficult for me to imagine that any reasonable person could, after reading the foregoing statement of the doctrine, entertain any the least doubt of its sufficiency or its truth.

It has been established by the labors and good fortune of Coste, Négrier, Gendrin, Lee, Jones, Raciborski—and, more than all, by Pouchet of Rouen. I am far, however, from withholding the expression of my admiration for the indispensable researches of Purkinje, Von Baer, Wagner, Thomas Schwann, and Bischoff. It is the doctrine, not of the humble author of this volume, but of the celebrated and honored men whose names I have above recited.

Dr. Paterson, Phys. to the Leith Dispensary, published a memoir in two parts, in vols. 53 and 54 of the *Edinburgh Medical and Surgical Journal*, January 1, 1840, and October 1, 1840. His doctrine may be stated as follows in his own words:—

"Upon impregnation occurring, a greater quantity of blood than usual is sent to the ovary which has been the seat of conception. Round the Graafian vesicle about to discharge the ovule, vessels become numerous and gorged with blood, and in the vesicle itself is commenced a process by which its waters are increased and its walls thickened.

This process we shall afterwards have reason to believe is of the nature of inflammation.

"The result of this general turgescence of the ovary, the increased quantity of fluid in the Graafian vesicle, and the formation of a substance around it, is the gradual pressure of it against the external coverings of the ovary, through the coats of which, as well as those of the vesicle itself, a small aperture is formed for the purpose of permitting the escape of the ovule."—P. 50.

This famous paper of Dr. Paterson's, therefore, upholds the doctrine of the rupture of the Graafian cell as a consequence of impregnation, and as a normal result of the periodical exacerbation of the ovaric force; which is not to be doubted of in all the zoological genera except man, and therefore not in man. It also maintains the notion of ovarian fecundation.

The former doctrines of menstruation give us no clear indications of a therapeutical treatment of the disorders so frequently connected with that periodical act. It was foolishness to assign as a cause of the menstrual periodicity an influence of the moon, since observation and experience showed to all inquirers that there is no coincidence of the act with any particular phase of the moon, some women being always to be found just beginning, just concluding, or midway between the periods of monthly evacuation.

The doctrine of a general plethora, peculiar to the sex, and required of them as a means to the end of reproductiveness, was easily refuted by the always obvious facts of persons menstruating regularly even when very much reduced by sickness or other causes of oligæmia.

The true doctrine was that of a local plethora, or, in other words, a state of periodical hyperæmia of the reproductive organs; and now that doctrine is not only established, but it is made plain to the understanding, for the periodical paroxysm of stromatic force, that hurriedly concludes the ripening of the most perfect ova, establishes the affluxion that fills the capillaries of the reproductive organs, and engorges them, or renders them hyperæmic to the point of compelling the monthly hemorrhage by which the hyperæmia is removed, leaving behind it no trace of indisposition.

This admirable exposition, for which we are so greatly indebted to its discoverers, preserves us from the most serious errors in our practice; while it reveals to us a vast deal of information as to the state and wants of women in whom the catamenia have become disordered, or in whom they have never appeared.

Heretofore, physicians have looked to the bloody sign alone as the act; hereafter, they will be likely to look upon the maturation and discharge of the ovarian ovule as the physiological act of menstruation, and upon the sanguineous effusion only as the sign that the physiological act has been or is being performed.

True menstruation is the regular periodical evolution and expulsion of an ovule; it is ovulation. This act may suffice to cause the woman to bleed mensually, or it may prove insufficient to that end. It is, for the most part, a matter of indifference whether it does or does not cause the mensual hemorrhage; the essential thing is to mature and deposit the ovule. There are many circumstances of the menstruating girl or woman that are able to prevent her from bleeding, notwithstanding she may enjoy all the other faculties of a perfect health.

As to the woman. A married woman who conceives in the womb does not necessarily upon that account cease to mature and deposit her germs. On the contrary, she retains a strong tendency to menstruate up to an advanced period of gestation. Yet she does not, as a very general rule, discharge the mensual fluid. But there are many examples of women who do actually retain, in the early months of pregnancy, the power to pour out from the vessels of the womb the usual product of menstruation; an act that must lead them to abortion.

Probably a woman has a much greater liability to abort at the time of her mensual crises than at any other time; which can only depend upon the occurrence of the catamenial effort under the periodical exacerbation of the germiferous force.

The same is true of the woman who gives suck.

A woman with a nursling at the breast does not, in general, menstruate until the child is seven months old; and thousands of women do not menstruate until they have weaned the child. Yet these women are liable to become pregnant; indeed, there are many who do become pregnant again and again before they have weaned their children, and before they have had the return. I say there are many such persons, so many, indeed, that the case is quite a familiar one to the accoucheur. A lady told me, on the 14th December, 1849, that she was pregnant again, and that she had not *seen* since the birth of the child, which was born before the infant she was at the above date nursing, and which she must now wean before the due time of weaning. Such facts are proofs of the continuance of the germ-production *in* the ovary, as well as of the ovulation.

As to the young girl. A young female who has been brought up at home, in the country, is rarely sent to a boarding-school to finish her education without soon finding herself the subject of a catamenial derangement. She may have been perfectly regular at home; but, soon after she takes her place upon the school-form, and devotes many hours to study, the menses are apt to be suspended, and to remain suspended until she leaves the school and ceases to consume her nerve-force in those mental or intellectual operations that require for their effectuation all the biotic force she is capable of evolving. The consumption of this force leaves her destitute both of the power and the necessity to discharge the menstrual blood; not depriving her, however, of the force required to fulfil the true physiological office, the ripening, to wit, and the discharging of her monthly ovulum from the stroma. Her ovulation goes on regularly, and she is well, though not visibly menstruous. I have found many young women thus affected; but, the health being in all other regards perfect, I have not ventured to interfere, beyond the interference of recommending a lessened intensity of mental labor, a more abundant and exciting diet, and a proper amount of daily exercise in the free air. Such amenorrhœas cease as soon as the girl leaves school. Similar observations are to be met with in the writings of medical authors.

The pregnant and the suckling woman do not menstruate because the life-force is fully occupied otherwise, yet they fulfil the germiferous law. In the same way, the studious and sedentary school girl does not menstruate visibly, because her nervous mass is already preoccupied. She performs, however, the physiological act of the ovi-ponte—or ovulation—yet she does not bleed.

Let the woman miscarry—or wean—and she will soon perceive the visible sanguine sign of her *ovi-ponte*. Let the over-tasked school girl cease to call upon her nervous mass for impossible supplies of biotic force, and her menses will speedily return and be regular in time and in sum; for her nervous energy is no longer misdirected and improperly consumed, in studies beyond its power of supply.

It is time to say a few words upon the catamenia as connected with the computation of the commencement of pregnancy.

I presume that a woman cannot be fecundated except it be coincidently with the ovi-posit.

As a rule, then, a woman is liable to become pregnant only at and about the periods of her monthly sickness, and in computing the commencement of pregnancy we shall commit the fewest errors if we begin the count at the day following that on which the flow ceased. Two hundred and eighty days should be allowed as the usual duration of a gestation.

One who is regular ought to *see* every twenty-eighth day. If she *sees* for three days only, then she ought to be twenty-five days without seeing.

In what portion of these twenty-five days is it that she is liable to impregnation? Dr. Pouchet says that the liability extends to twelve days after the drying up of the discharge, and not beyond that time.

It is, perhaps, rash to say so; and yet it seems improbable that the ovule should retain its vitality without fecundation, so long as twelve days after its escape from the follicular pore. It is rash to say so of the human female; whereas, in the roe, it has been shown that the fecundated ova remain in the vector tube from September until mid-winter.

The Jewish law commands the woman to abstain from the husband's bed until she shall have become clean, being unclean for eight days after the disparition of the last drop. Several Jewish females, having numerous children, have informed me that they have religiously observed this law in all their marriage. If these women spoke truly, they gave incontrovertible evidence that the fallen ovule retains its fitness for impregnation, not only during the eight days subsequent to the drying up of the courses, but even longer, since we know not precisely at what period of the mensual act the ovule departs from the cell. In the case mentioned on page 122, of the young girl, whose womb and ovaria were given to me by Dr. J. Wallace, the patient died while menstruating—and the uterus still contained a certain quantity of the menses: yet here the crypt was open, and the ovule had already escaped. It might, therefore, be fecundated as soon as the menses should disappear, but not before that disappearance.

I repeat that we do not, as yet, know at what period of the mensual act the vesicle bursts. The above example proved to me that the rupture took place in the young girl previous to the drying up of the discharge; so that, in the case of the Jewish women, if the same rule holds, we perceive that the ovule may be discharged, and yet retain its vitality without fecundation for eight days, and even more than eight days. But we do not know where it rests in such a case, from the period of its escape from the ovarian ovule, until it becomes fecundated eight days later.

In July, 1848, a young girl destroyed herself by taking arsenic, just before the expected return of the menses. Dr. Wistar, of this city, who examined the body, informs me that in one of the ovaries was a blood-red spot the size of a lentil. There was no absolute rupture of the crypt as yet, nor any blood in the uterine cavity.

After the foregoing, I am clearly not called upon to say at what precise period after the courses, a woman cannot possibly conceive. I have no doubt there is such a period. Time, and opportunity to observe, can alone settle this point. The celebrated case of the birth of Louis XIV., and the advice of the court physician, Fernel, relative thereto, ought not to be cited, since they have none of the characteristics of rigorous truth. It shows, however, the old date of opinions on this point. I am for the present very willing to believe, with M. Pouchet, that a woman shall not conceive later than the twelfth day, as a general law. Nevertheless, it may be that, occasionally, the fecundation may occur even later.

I am much obliged to a young gentleman who gave me the following notes, in which I place implicit confidence. He gave them to me with consent of his wife, who is the subject of them.

Mrs. * * * æt. twenty-three, gave birth to a daughter, May 30th, 1848. The child died, aged eleven days, and the milk dried up. Aug. 6th, the catamenia returned, and lasted to Aug. 11th. Aug. 29th, sexual relation; no result. Sept. 6th, 1848, catamenia returned, and lasted to the 12th. September 24th, sexual relation. October 6th, catamenia returned; lasted to the 12th. October 25th, sexual relation; conception + thirteen days. February 14th, quickened = 104 days.

There are questions connected with this topic that ought not to be lost sight of by the diligent Student, who desires to prepare himself upon all the points of a professional duty. For example—

Some women are to be met with who never menstruate, and who yet preserve a most perfect physical and mental health.

Among these exceptional creatures are to be found those in whom the ovaria or the uterus has never been developed. Dr. Renauldin, on the 28th of Feb., 1826, reported to the Royal Academy of Medicine the case of a woman who died at the age of fifty-two years. She had never had any appearance of menstruation. The breasts were not developed. She had only a cervix uteri, which was of the size of a writing-quill—there was no womb proper—and the ovaries were scarcely developed.

Such a woman could not menstruate because of the double failure of uterus and ovary. There could be no sexual passion; indeed, such a creature was scarcely sexual.

When Percival Pott, the illustrious surgeon, removed the ovaria of his patient under an operation for hernia, he took away with them the power of menstruation. There are numerous examples of females who did never menstruate, owing to the absence of the ovaries. When our domestic animals are subjected to the operation of spaying, they are totally deprived of the power of ovulation; and with its loss the sexual sense disappears as well as the sexual attraction also; or if any remains are discernible, they are very imperfect.

As to the cases of absence of the womb, they are less rare than the former, and ought not to be lost sight of by the inquirer, lest he permit his ignorance to lead people into a grievous unhappiness. A woman ought not to be married who has never menstruated, until it shall have been clearly ascertained that she is not amenorrhœal from faulty development.

I have seen two pretty women who were suffered to marry before it was ascertained that they had no wombs.

Any attempts that were made, in either of these cases, to bring on menstruation, are well fitted to cast ridicule upon the physicians. A physician should never be otherwise than cautious in all his dealings with cases of absent or suspended menstruation. I state the following instance, in order to show the evil effects of a want of medical cautiousness.

Mrs. Blank, aged twenty-two and a half years, was married to her present husband more than two years ago. She is of a middling stature and fair complexion, and presents all the exterior appearances of a person in perfect health.

She is not fat, but has a certain embonpoint, a good figure, and a very feminine and most agreeable expression of countenance. She is, indeed, a handsome woman.

She has never menstruated, nor has she suffered from catamenial pain, or severe attack of any disease. Seeing that she did not menstruate at the proper period, medical advice was sought and followed in the treatment of the case. The treatment was unsuccessful, and she was married with the expectation of her friends that the union would be followed by an eruption of the catamenia. The mammæ were, at the period of the marriage, well developed, and the pudenda was amply supplied with hair; indeed, all the phenomena of a perfect development of the sexual system were present except those connected with the menstrual office.

The husband found, however, that some unknown cause acted as an impediment to the congress, and after more than two years of concealment, he consulted me on the subject.

An opportunity being allowed to me for a full investigation in presence of the mother, I found the external organs perfectly formed, the mons large, the labia and the nymphæ, as well as the clitoris, perfect, and the os magnum of a natural appearance; but the vagina was a mere cul-de-sac, not more than two inches and probably less than that in length. Upon pressing the point of the finger strongly against the bottom of the cul-de-sac, it seemed to have no connection with any part above it.

I requested the lady to lie on her back; and, introducing the index finger of the right hand as far as possible into the rectum, I explored with it the excavation of the pelvis, in order to discover any tumor or organ that might be contained within the cavity; but, as all the tissues were ductile and very yielding, I began to suspect that there might be no womb at all in the case. Therefore, laying the fingers of the left hand upon the lowest part of the hypogaster, and pressing them firmly towards the finger that was used in exploring the internal parts, I found that they could be brought so near to each other as to make it perfectly clear that there was no womb in the case; otherwise, I must have felt it, so near was the approximation of the fingers of the right to those of the left hand.

Having by the most careful exploration in this manner discovered the unfortunate state of the young lady, I felt obliged, in a conscientious discharge of duty, to tell her the whole truth, which I did in the best way I could; and yet, as may be readily supposed, the knowledge of her situation was accompanied with all the manifestations of that violent distress and agitation which might naturally flow from such unhappy circumstances.

The aphrodisiac sense in this lady is *very strong*, which might well be the case where the ovaria are fully developed, even though the uterus had never been evolved in her constitution.

I was deeply impressed myself with the melancholy fate of two estimable persons, who would never have placed themselves in so unhappy a condition, if, by a proper exploration of the parts before marriage, the real state of the case could have been discovered. The case also seems to show how improper it is to permit the rites of marriage to be solemnized for persons who do not possess all the attributes properly belonging to the sexes. I do not contend that every case of failure to menstruate at the proper season is indicative of the necessity for exploration by the touch; but I think no case of extraordinary protraction of an emansio mensium, and especially where any question of contract of marriage is likely to arise, should be allowed to go on without the acquirement, by a medical adviser, of true and perfect knowledge of the facts as to the organization of the parts.

In the early part of the present year, 1848, I met with another example of similar want of development in a comely young person who had been married some three months before. A shallow vaginal cul-de-sac at the bottom of well-developed external genitalia, mammary glands of full size, warm aphrodisiac temperament, and abundant hair, showed that all the sexual physical attributes were present, save only as to the absence of the uterus—no trace of which could be detected by Dr. Pancoast, Professor of Anatomy, by Dr. Jewell, of Philadelphia, or by my own careful exploration. No doubts were left upon our minds of the complete failure of uterine development.

The persons interested in this unfortunate situation, though less sensitive than those mentioned above, were rendered unhappy by so grave a mis-alliance: probably the last consequences of it may be greatly to be deplored. How important, then, is it that medical attendants, the only persons who can be competent, should be always ready and watchful as to these points of duty.

Not only on account of the risk of fatal mistakes of the kind above mentioned, should we be ever attentive to the duty of making accurate diagnosis, but there are a great many other shoals and quicksands in the track of the young practitioner, who fills his sails with the prosperous and flattering winds of his earliest successes.

He would find himself under obedience to a good rule who should firmly resolve never to pronounce any opinion, as to the catamenial disorder, until he has taken measures to form a solid and inexpugnable judgment on the cases submitted to his decision.

The consultations relative to this class of diseases are very numerous for medical men engaged in business. Well, let it be a rule to suspect of pregnancy every married woman who complains of amenorrhœa. This, though so obviously proper, is a rule often lost sight of by the medical practitioner, whence it happens that we encounter, now and then, the ridiculous circumstance of protracted and vain attempts made by medical men to bring on menstruation in married women, who prove in the end to be pregnant. I have met with many such instances.

Let every married woman who does not menstruate be, therefore, treated as if reasons exist for supposing her to be gravid. If, by the lapse of time or by the occurrence of circumstances, a solid conviction can be attained that the patient is not gravid, she may be sufficiently early subjected to treatment conformable to her wants.

In like manner, in young unmarried women failing to menstruate, yet exhibiting no other evidence of disordered health, there is always time enough to consider what may be requisite in the treatment. The more especially, if we may believe, which I consider undeniable, that such a woman, healthy, vigorous, and in all respects enjoying the complacency that can only exist in those that be well, does really perform her physiological act of menstruation—to wit, in the regular deposit of her germiferous ova, yet without manifesting it by the *sign*, I mean the mensual hemorrhage; or else that pregnancy prevents the exercise of menstruation.

It will, perhaps, appear to be almost a rudeness to make this assertion, and I should not venture to make it in this place, but under a sense of the duty I owe the young Student, which calls upon me to put him early upon his guard. I have so often been nearly deceived in instances of this kind, that I am convinced that nothing but a constant cautiousness has saved me from making the grossest mistakes. Many have been the occasions of my being consulted for catamenial obstruction, with a design to entrap me into the administration of drugs that might remove the difficulty by procuring abortion; but, like all those who will resolve to adopt the rule which I suggested above, I have hitherto escaped so distressing an error of commission. Should a female, presenting all the appearances of brilliant health, complain of such *obstruction*, I should be sure to come to one of the conclusions indicated in the paragraph—viz.: either the ovarian stroma is active and regular in the performance of its mensual physiological act of ovulation, or else that a gravid state prevents the sign of the act from becoming manifest.

CHAPTER VII.

AMENORRHŒA.

A YOUNG woman sometimes is observed to reach the usual age at which the menstrua commence, without having any appearance of the discharge. In this case, she is in a state which is denominated *emansio mensium*, which is one form of amenorrhœa.

When a person who has before been regularly affected ceases to have the periodical returns, she is more properly to be said to have amenorrhœa; for the term *emansio* belongs to the former, and the other term, *amenorrhœa*, to the latter class of cases.

I have already, in another place, fully expressed my opinions as to those puberic conditions that may interfere with the regular exercise of the catamenial office; those that can postpone the first exhibition of it, or derange or suppress it in those who have shown that they had once attained the full power of it.

Many people are met with who become alarmed if the young persons under their care fail to menstruate at the usual age; but I wish the Student to reflect that, while it is usual to look for the event when the girl is about fifteen years old, we have no reason to be alarmed even though she should advance to her sixteenth, or, indeed, to her seventeenth year without *changing*, provided her health should be in other respects good. It is only when the failure to menstruate coincides with some other evident sign of weakness or disorder, that the individual should be held to be, and be treated as a patient.

The power of ovulating should always be looked upon as the complement of the physical forces of the sex; and it is reasonable to believe that instances must now and then occur of girls who, having attained to the apparent perfection of all other physical forces, are unable to rise to the height of this last and finishing evidence of generic and genetic power.

I deem it to be quite consistent with the facts of the case to believe that where such failure to attain to what is called complete puberty (*pubertas plena*), is not clearly connected with some evident topical lesion, the failure should be attributed to an hydræmic condition of the girl. The healthy constitution of the blood is expressed by 210 solid elements, and 790 aqueous portions. A rapidly growing girl, who, in approaching the period of puberty, makes excessive demands upon the solid constituents of her blood for the purposes of nutrition and growth, is liable to call for a quantity beyond the power of supply, and so come at last to carry the figure for the aqueous constituent from 790 to 800, or even to 820 or 850, while the figure for the solid constituents, or the true blood, must go down to 200, 190, or even so low as 150.

It should be observed that the blood is in reality the solid constituent, the production of which cannot be effected save by a power of hæmatosis, appertaining to a living solid. The evolution of it must therefore bear some ratio to the powers of the special solid upon which it depends. Such power may be greater or less at different times, and therefore is liable to be more or less completely exhausted. As to the watery portion or diluting portion of the blood, it should be observed that it is not formed by the solids, but only taken in by absorption or endosmose, and therefore costs nothing to the constitution. But the solid elements, such as the fibrin, albumen, and corpuscles of the blood, are products of vital operations and living forces, that may be checked or exhausted by over-tasking.

If six hundred ounces might be regarded as the mean quantity of blood in an adult in good health, then it will happen that, when the solid constituents are too rapidly consumed, the whole quantity within the vessels shall not be less than six hundred ounces, but the blood shall be weakened by the abstraction of a portion of its essential or solid part, and by the addition to the remainder of a sufficient quantity of water to keep the whole up to the figure of 600; for, in the extremest degrees of hydræmia, the vessels are to be supposed equally full as in the extremest cases of plethora. The difference between plethora and hydræmia is not a difference in the quantity, but only a difference in the proportion of the aqueous to the solid constituents.

I think the foregoing may serve to show that, where a growing girl, by using too abundantly the solid constituents, has obtained an excess of the watery element of the blood, she ought not to be expected to do more than carry on, and that very imperfectly or feebly, the ordinary operations of her physiological forces. It ought not to be expected that she could do this and at the same time attain to the possession of her complement of forces.

A fruit-tree in a soil too poor to afford ample nourishmen may live and grow, but it will not blossom and bear fruit, because it is destitute of both the elements and the stimulus that are requisite to enable it to attain the blossoming and fruit-bearing complement of its living forces. The fruit-tree derives its nourishment from the soil in which it is planted. The blood, on the other hand, is the source whence all the solids of the girl are derived; if the blood becomes impoverished, by an inordinate addition of water in the solid constituents of it, the girl, like the fruit-tree, cannot attain to the complement of her powers.

To show how this impoverished state of the blood or hydræmia must act on the health, let me say that the whole class of the insects are supplied with their oxygen by means of tracheæ, the fishes are aërated by branchiæ, while some other animals are furnished with lungs. But whether the machinery of aëration consists of tracheæ, branchiæ, or lungs, the purpose of all that various machinery is clearly to afford a convenient access of oxygen to the molecules of the animal tissues, particularly the nervous mass of the creature. In warm-blooded creatures, that have lungs, the oxygen can have no access to the tissues save as it reaches them in the blood. Hence the blood is, in such animals, the oxygeniferous medium or organ. It is the transporter or conveyer of oxygen. Where oxygen cannot go, in a living creature, there is asphyxia. If the nervous mass does not receive a due supply, the nervous force is not duly extricated. Nothing appears to me clearer in physiology than this, viz., that neurosity (nervous force, or innervative force) is the immediate product of the combination of oxygen with nervous mass or nerve-corpuscles. Certainly nothing is alive that is not in presence of oxygen, for no living thing can exist in carbonic acid gas, or azote, or hydrogen alone.

Now let the Student consider that the figure for healthy blood being 210 for the solid constituents, what must be the effect on its oxygeniferous power of reducing the 210 to 150? Will he not say that, as it is not the water of the blood that takes up the oxygen of respired air, then, when the figure becomes reduced from 210 to 150, there must be concomitant reduction of its oxygeniferous force, and consequent diminution in the evolution of the neurosity, as M. Cerise denominates it.

Under this aspect, he perceives that he has a clear rationale of the debility of the anæmical or chlorotic girl; he will say that her tissues, especially her nervous mass, being incompetently oxygenated, the fruits of such a state are manifested in the weakness, not of the limbs only, but of all the functions and powers of the economy. The hydræmic girl must hence be weak—weak as to all her functions—quite too weak to afford us any reasonable expectations that she shall attain to the complement of her forces, while the hydræmia remains uncured.

I cannot, therefore, see the reasonableness or the hopefulness of attempting the cure by the exhibition of emmenagogues. On the other hand, it is probable that success will crown our efforts, provided they be wisely directed to the removal of her hydræmic malady, for that is the cause of the delay.

This may be done by proper regulation of her diet, her digestion, her clothing, exercise; by change of scene, travelling, suspension of studies; by requisite lapse of time, and, as a medicinal agent, by iron.

Attention to these points will very rarely fail to bring about the cure in such cases as I now speak of.

As to iron, I shall use this opportunity to say that it is iron which the patient requires, and not some certain salt of iron compounded by the chemist. As every act of digestion is accompanied by a process of acidification, the acid produced in the *primæ viæ* will always be capable of combining advantageously with the impalpable particles of iron-by-hydrogen. It is even probable that, where a salt of iron is exhibited by the practitioner, the article is first decomposed during the chymification, and afterwards recomposed according to the state of the organ of digestion, and that it is a work of supererogation when the physician will present to the vital organs a salt, when they want the base, to do with it what is right, of which their organical *entelechia* can judge better than any *man*. I have come to a conclusion that, since we have obtained the beautiful preparation of Messrs. Quévenne and Miquelard, I shall never hereafter think it necessary to prescribe my chalybeate doses in any other form than that of impalpable powder procured by hydrogen from the oxides of iron; and that I shall always entrust to the vital chemistry the task of making up the salts of it.

Let us now advert to other circumstances that may prevent a young woman from menstruating when she has reached the usual age for the appearance of the menstrua.

I need not here speak of those cases in which some considerable disorder of another and important organ or part serves to concentrate upon itself the powers of the living economy, which they divert from a general to a particular use or determination. Among these are all those affections that tend to set up a hectical irritation in the system, such as consumption, chronic rheumatism, painful and long-continued inflammations of the articulations. These causes of amenorrhœa are too self-evident to require more than an allusion to them; and any sensible man, even in the very beginning of his career, might be supposed capable of seeing in them the causes of the failure, and of trusting upon the cure of them to find the function in question at liberty to establish itself.

It is of more importance that the Student should know that some women are now and then met with who have emansio mensium from the want of a womb with which to menstruate, or of ovaria to provide the sources of menstruation in a regular periodical ovulation.

It happens that organs become blighted, during the embryonal or the fœtal life, and never grow nor develop themselves after the birth of the child.

If these organs are not essential to the mere animated existence of the infant, it may grow up in the apparent possession of all its faculties and attributes. Should such a blight or abortion of an ovary, a womb, or vagina occur, it would be very likely to escape detection until the age of puberty, and then disclose the remarkable truth by a state of emansio mensium.

I have already mentioned two married women, neither of whom had ever menstruated, and both of whom were wholly destitute of any discoverable traces of a womb. Yet each of them was in all other respects a highly sexual creature, being fully provided with all other sexual attributes and marks. But they can never admit of the consummation of marriage, nor menstruate. Their strong sexual propensities gave evidence of the perfection of their ovaries. I have no doubt that both those women performed, with the utmost regularity, the monthly acts of their ovulation, nor that they were the subjects of the monthly ovarian and vaginal hyperæmia; but they gave no visible signs by the mensual discharge of blood. Such cases admit of no medical treatment.

Again, certain women grow up and attain to a good old age, without experiencing any, the least sexual excitement, and without once menstruating during their whole lives. Upon examination after death, it is found that the ovaria were wholly wanting, or that their development having been arrested in the fœtal stage, they had never been evolved beyond their fœtal form and nature. Such cases as these are also beyond the powers of the medical art.

In some young women, the canal of the neck of the womb, in the cavity of the body and fundus uteri, is found to be annihilated, in consequence of inflammation, that has filled the cavities with plastic exudation resulting in a fusion of the walls into one common substance. Such women cannot menstruate, save where the atresia affects only the canal of the cervix. When that is the case, the womb may pour out the blood of the menses, which is retained within its distended cavity. Another and another menstruation adds to the accumulation, until the uterus, pregnant as it were, and distended with the product of repeated menstruations, either causes the barrier to give way through over-distension, or until the surgeon, become aware of the truth, perforates the obstructed canal with his bistoury or his trocar, after which the courses are regularly seen to return with every ovulation.

The uterus and ovaries may be healthy while the vagina may be closed by want of development in the embryonal stage, or in consequence of inflammation ending in cohesion and atrelism. Here, as in the case last spoken of, the menstrua are regularly poured into the womb and vagina, and retained until relieved by accident or by means of the surgeon's art. The same may be said as to the cases of imperforate hymen.

All these causes of emansio mensium are to be remembered in extraordinary examples of failure to menstruate at the proper age; and when the time arrives to make the needful inquiries, those inquiries should be made with the greatest care, in order to avoid mistakes in diagnosis.

Such are my views in general as to emansio mensium. But I do not intend to deny that some of the cases of it do depend upon a torpid, sluggish, or obtuse nature of the bleeding organs, the womb itself. It must, however, be always a very difficult task to verify such a diagnosis, except by means of *tentamina medica vel therapeutica.*

If, upon scrupulous inquiries as to all the possible causes of the emansio herein before described or alluded to, the Student should be left to the reasonable and indeed only remaining conclusion, that the fault rests with such a torpid and insensible uterus, then he might well attempt to excite within it a more active, vigorous life, by means of the stimulating articles that are called emmenagogues. Let him provoke a frequent, moderate tenesmus, by means of aloetics and gum-resins of various kinds; let him stimulate the nerves of the pelvic region, both internal and external, by baths, fomentations, cataplasms, embrocations, sinapisms, dry cupping or blisters, used as the endermic part of the treatment, while, at the same time, he stimulates the internal nerves of the pelvic region with Dewees's vol. tinct. of guaiacum, compound tinct. of aloes and canella, elixir proprietatis, Lady Webster's pills, tincture of black hellebore, tinct. of cantharides, etc. etc. Forasmuch as all the above-named medicines and means do tend to increase the vital activity of parts about the pelvis, a reasonable probability exists that they may usefully coincide with general constitutional measures in arousing the dormant sensibilities of the womb, and placing them in just relation to the powers of the ovary in its acts of ovulation.

In my opinion, though the causes now enumerated are not rarely to be regarded as lying at the foundation of amenorrhœal affections, the major part of the examples are dependent upon a lessening or cessation of the force by which ovarian vesicles are evolved and matured. Patients suffering with chronical maladies, attended with protracted amenorrhœa, exhibit, in the ovarian stroma, no vestiges of the Graafian vesicles. I lately examined the ovaria of a girl who died after some eighteen months of severe chronical ailments, during which she did not menstruate. Those ailments had no primary connection at all with any state of the reproductive organs, yet, upon carefully examining the ovarian stroma of both the ovaries, it was found to be a compact, whitish tissue, very similar to that which we observe in women long past the change of life. No trace of the ovarian vesicle existed in either of them.

It is clear from this dissection that the lady could not possibly have menstruated, if the *doctrine* be true; and further, that, in case her health could have been restored as to her chronic malady, many days, weeks, or months must have elapsed before the ovarian stroma could have developed the vesicles, or matured and discharged them, so as to give rise to the sanguineous sign of the mensual act. It is useless to ask, in this place, what powers are possessed by the menagoga, speedily to restore the discharge, in such cases of amenorrhœa.

Having in the earlier part of this chapter expressed the opinion that most of the cases of *emansio* ought to be regarded as results of a real hydræmia, or watery state of the blood, I feel disposed, before I close the subject, to lay before the Student some further views, and especially certain opinions on that subject, that appear to me likely to throw light upon his path in the study of those strange disorders, and I therefore proceed by calling his attention first to a few simple propositions.

I beg him to weigh them, and judge whether they appear to him to be consistent with truth, or with a high degree of probability as to the truth, which it should be the object of all men to know.

These opinions, that I am now to utter again in this place, have not been favorably received in certain quarters, though in others they have made such impressions as I expected them to make. But, whether accepted or not, all that I desire in regard to them is that they may be received and spread abroad if they be true, while I hope they may be utterly confuted and rejected if they be untrue. Truth belongs to no man. Truth is God's; he is the sole source and fountain of truth. Any man who boasts, saying this is *my truth*, this is my fact, is a fool and a braggart; since the utmost that man can do is to perceive and recognize truths, which, themselves, are mere proclamations or acknowledgments of God's law and will as to physical and psychical things.

The first proposition that I shall here offer to the Student is this, *videlicet*:—

The living body consists of fluids and solids—which might be otherwise expressed by saying that it consists of the tissues and the blood.

The blood contains all the materials out of which the tissues are to be constructed. So that it is true to say, with a celebrated physiologist, the blood is the fluid body, the body is the solidified or concreted blood.

The body is separated from the blood by a membrane or tissue which serves as its outward boundary, and prevents the blood from mixing with the whole mass of the tissues. So that, while the blood permeates all the tissues, it is confined within certain strict channels of the blood-vessels.

This delimitary membrane is generally known as the *membrana vasorum communis*, or common membrane of the vessels, and is the inner lining of all the arteries, veins, and sinuses of the living body. It might be regarded as a multilocular cyst or sac—the several arteries, veins, or capillaries representing each a separate *loculus* or cell of the general sac. This sac is the only living tissue with which the blood ever comes in contact.

As long as the blood remains in contact with, or in normal relation to this sac, it retains its health, and vigor, and crasis; because, as the blood cannot exist save by its connection with and through its dependence upon the nervous mass, this membrane is the organ of induction into it of the nervous force, or life-force.

It is certain that, whenever the connection betwixt the blood and the living solids is destroyed, the blood perishes.

Whether we regard the blood-disks as cells or not, we cannot deny that they are living entities; but their life is rather epizootic than self-substantial; there is but one circumstance in which they can maintain their existence, and that is the one above mentioned, to wit, they cannot exist save in the presence of the membrana communis, since through that organ they receive their inducted life.

If that organ of induction be perfect, the corpuscles may become perfect: if the organ become imperfect, or if it lose its vitality, they fail or they die along with it.

From the foregoing, I deduce that the membrana communis is charged with the faculty, not only of confining and conducting the course of the blood in the acts of circulation, but that it contains within itself the power to make the blood, and that it is indeed the *blood-membrane.*

If it may be healthfully constituted; if it may enjoy in perfection its crasis and its powers; then it may also, under certain circumstances, be subject to modifications of both crasis and power that shall affect the state of the blood-corpuscles, and render them unhealthy, or imperfect; for, inasmuch as the membrana communis is occasionally affected with inflammation, with weakness, with contusions, wounds, and other disorders, and as it is capable of those vital processes that are called adhesions, inflammation, suppuration, etc., it is impossible to deny not only that it may be strong or weak, or healthy or unhealthy, according to circumstances, but that the crasis of the blood must depend upon the state of the blood-membrane.

I have been condemned for using in my writings a word which I derived from the illustrious Professor Burdach, who ought, it should seem, to be held sufficient authority for the introduction of a word into our medical terminology. The very persons who have railed at me for using Burdach's word have no hesitation daily to employ a similar one. Such, for example, as the words *endo-cardium* and *endo-carditis*, from εν or ενδον and χαρδια, by which they mean to express the idea of the lining membrane of the heart, or an inflammation of that lining membrane.

For my own part, I cannot discover any unreasonableness in Burdach's suggestion of the term *endangium*, from ενδον and αγγειον, *inner-vessel*, to express the idea of the lining membrane of the aorta, of the cava, of a great artery, vein, or sinus, since the Greek word *angeion*, and the other Greek word *en* or *endon*, express an idea of the same membrane, which is called endocardium, but only as being not confined solely to the cavities of the heart alone.

To repeat, or to write the long sentences, membrana vasorum communis, or *membrane commune des vaisseaux sanguins*, or the lining membrane of the blood-vessel system, is a useless toil; wherefore, I shall beg the Student, hereafter, to allow me to speak of it by using M. Burdach's short and euphonious term, *endangium.*

So much I have thought it incumbent on me to say in my own defence; and now I come to the question, whether the endangium is, in fact, charged with the important offices I have supposed; and here I must invite the Student to judge for himself upon an examination of the facts, particularly the following facts, that will nowhere be denied.

A child, in its mother's womb, touches her only by its placenta, which consists of the vascular tufts into which the umbilical arteries are divided upon reaching their place of destination in the after-birth. The placenta takes out of its mother's blood the oxygen and plasma sanguinis required by the fœtus.

The child in utero takes nothing but plasma, which is water, with a certain protein, probably, under the form of dissolved albumen and salts. It takes no blood, but only plasma.

But the blood, out of which the whole body is made and maintained in its status sanitatis! Whence comes this blood, this generator of the body?

I have neither purpose nor time to enter at length into an examination of the principles of the hæmatosis. Such an essay requires not a few pages, but a volume; but, without entering at large on the subject, I may, in hopes of explaining myself, state a few particulars for that end.

1. The blood is daily renewed by means of the alible matter digested in the stomach and bowels, and absorbed by the lacteal absorbents, by which it is transferred to the blood-vessels.

2. The whole of the blood is contained in the heart, the arteries, the capillaries, the erectile tissue, and the veins.

3. The only tissue that the blood touches is the endangium, which is the lining or interior membrane of all blood-vessels. In the viscera —in all the organs, indeed—it is probable that the ultimate ramuscule of a vessel consists solely of endangium, the stronger coats being unnecessary in the last distributions. The endangium, to use the idea of Prof. Burdach, separates the blood from the body, as the scarf-skin separates the body from the external world. The endangium is the delimitary membrane of the blood. The blood perishes, or changes very soon, almost immediately, after it escapes from within the endangium. It is converted—or it is coagulated, or it dissolves, or it ceases to be blood, upon leaving the cavity of the endangium.

4. Notwithstanding the chyle—particularly chyle taken from the upper end of the thoracic duct—contains vesicles or globules, or corpuscles, that are of a reddish hue, and that are the results of the earliest morphological operations of the hæmatosis, it is not proper to regard these corpuscles as blood.

5. Soon after the chyle is poured into the cavity of the endangium, and becomes exposed to the influences of the oxygen in the lungs, it

acquires the character of perfect blood. The fœtus in utero touches the parent only by the placental tufts that it has developed at the extremity of its umbilical artery. It is only by these placental tufts that it can receive from the parent the material supplies for its hæmatosis. This material enters into its sanguiferous system alone, since it comes into the vena cava by the umbilical vein. If the child has a power to make its own blood, it is clear that it makes it within the walls of its endangium. There is no other *solid* that the alible material of the child can come in contact with. Therefore, either the blood makes itself, or the endangium of the embryo makes it.

6. It is, therefore, not to oxygen alone that it is indebted for its morphological development.

7. Contact with the endangium is essential to that development, since the blood loses its physical character as soon as it ceases from that contact. The endangium contains the force that makes the blood. This proposition, which I put forth in my *Letters to the Class*, has been denied. I reiterate it here; and I ask what violence is done to probability in this doctrine, seeing it is universally admitted that the power of a cell—a far more simple and elementary body—is so great that it can, out of the alible cytoblastem in which it exists, produce, by its metabolic and plastic energy, cartilage, ligament, skin, muscle, aciniferous viscera, nerve, and, indeed, all solids of the body? If the το μηταβωλικον και το πλαστικον really appertain to the simple tissues of cells, may we not concede a higher power to the elementary structure which we call endangium? The cell-power is a power of presence and contact, not a power of percolation or endosmose or exosmose merely.

8. The endangium is the blood-membrane. When it is healthy, the blood is so—when it is diseased, the blood becomes diseased. The health of the endangium is as essential to a normal hæmatosis as that of the gastro-intestinal mucous membrane is to the health of the digestive force. In diseases of the endocardium, the functions of the heart are modified, but the endocardium is the endangium of the heart. Similar affections of the endangium, ranging throughout extensive portions of the sanguiferous system, derange the blood-vessels in which they occur, and the whole mass of the blood.

9. Simple diminution of the life-force in the endangium produces the idiopathic forms of anæmia, in which the solid constituents of the blood become lessened in quantity, while the aqueous constituent increases in quantity.

10. One thousand grains of healthy blood ought to contain seven hundred and ninety grains of water. In hydræmia, a thousand grains

may contain eight hundred and fifty grains of water—or even more. Such a state of the blood is hydræmia.

11. Plethora is a contrary state, one in which the watery proportion is lessened, and the solid constituents augmented.

12. The endangium is the regulator of these proportions; when its powers are either lessened or exaggerated, the crasis is changed.

13. The nervous mass, acted on by oxygen, gives out the nerve-force, the biotic force, the life-force. It does not extricate or give out that force under any other exciter or influence.

14. The arterial blood conveys oxygen, which it imparts to the nervous mass. Oken scarcely speaks metaphorically when he declares that an artery is an air-tube; it conveys vital air, oxygen. Perfect blood conveys the due amount of oxygen required to develop a perfect innervative force. Imperfect blood cannot convey a due amount of oxygen—whence the innervations produced by it are inevitably imperfect.

15. The health, activity, and power of all the organs are but the exact expression of their innervation: under circumstances of imperfect blood in the endangium, their health, activity, and power become deranged.

In these propositions, I have set forth the opinions I have long held as to the influence of states of the endangium upon the health. I am, perhaps, imprudent again to put them forth in this manner, and without the array and support of many facts and many arguments that I deem confirmatory of them. I prefer, however, to submit them to the reader in all their nakedness, rather than not to present them for his examination. I hope that, in any event, they may serve me to elucidate the rationale I am about to state as to the amenorrhœal affections which are still under consideration.

I have said that the reproductive is a complemental force, and that menstruation is a sign of the active state of that force.

The blood of an anæmical girl is incapable of developing her innervative force in sufficient amount for the regular operation of the ordinary functions. She will, therefore, scarcely produce nervous force sufficient to execute both the special and the complemental offices of her life.

The amenorrhœal girl is generally anæmical. To cure her anæmia is to re-establish the dominion of her life-power over both the special and the complemental powers and offices of the system.

No attempt should be made to bring on menstruation in order to the cure of the anæmia; but, *mutatis mutandis*, the anæmia should be cured in order that her blood, fully and thoroughly oxygeniferous, may enable her nervous mass to extricate the biotic force in sum, equal to the demands of the general, as well as the special or complemental wants of the economy.

The curative indications for such ends consist in the use of drugs, frictions, baths, exercise, dress, diet, and medicines—as well as the psychiatric recommendations that may be apposite for the cases.

Drugs.—Aperients are, for the most part, indispensable, and they may well consist of a basis of aloes, or other resinous cathartics, in combination with rhubarb or extract of colocynth—and upon occasions, of mercury.

The celebrated Hooper's pill, which is familiarly known by every mother in the land, is composed chiefly of aloes.

The Dinner-pill, or Lady Webster's pill, is also aperient on account of the aloes combined with it.

In some of the samples of amenorrhœa, which, while they depend mainly upon a want of vigor in the blood, may derive a part of their rebelliousness from unhealthy states of the circulation and innervations of the pelvic viscera, a useful resource is to be found in the compound powder of jalap. Doses, consisting of twenty grains of jalap, forty grains of cream of tartar, and six drops of oil of anise-seed, may be given every alternate morning with considerable advantage. I have sometimes directed my patients to procure half a dozen packages, each containing such a dose, and to use one of them every other day, until the whole of them should be taken.

When the idea is entertained that the hepatic secretions are impaired under a vicious state of the portal circulation, a very proper alterative will be obtained by the exhibition of six grains of blue-pill, fifteen grains of extract of taraxacum, and ten grains of soda, suspended with a drachm of gum Arabic, in an ounce of distilled mint or cinnamon-water. Such a dose should be followed by an aperient dose of magnesia, oil, senna, or salts.

Tonics.—The most available tonic is iron.

Iron appears to possess a peculiar power to modify the rate of the hæmatosis. Certainly, one might in vain endeavor to remove certain cases of anæmia by the aid of quinine, the various vegetable tonics, and the mineral tonics, with the same rapidity and completeness as with the ferruginous medicines. I believe that common experience teaches the truth of the above proposition.

I know not what is the rationale of the almost specific power of the martial preparations in anæmical disorders, and I am unwilling to enter upon the question, whether the iron enters into direct combination with the blood, to render it more powerful and more noble by its union with it—or whether it acts as a direct tonic for the solids of the economy, imparting a greater energy to the cell life of the blood-corpuscles. I am not capable of settling this question, and I suppose no other man is able to do so—nor is it vitally important that it should be settled. But I think nothing is better or more clearly established in my mind, as a therapeutical maxim, than this, namely, that an anæmical girl, who labors under no other malady, is cured of her anæmia in about sixteen days, by the proper use of iron.

The use of iron was well known so far back as the days of Louise Bourgeois, who, in her *Observations diverses sur la Stérilité, perte de fruict*, etc. etc. (Paris, 1627, 12 v. p. 23), says: "*Pour en avoir l'heureuse yssue, il en faut user trois sepmaines, ou un mois; mais sans aucun doubte toutes les incommodités causées par le mal, cesseront avant quinze jours;*" that is to say, in order to reap the benefit of the medicine, it ought to be employed for three weeks, or a month; but, beyond all doubt, the whole of the inconveniences arising from the disorder will be at an end in a fortnight. Now, Louise, who speaks so positively on this point, was unacquainted with our beautiful preparation, iron-by-hydrogen, and used one which, though not so good as ours, was yet capable of producing such remarkable effects as she points out.

As Louise was a celebrated practitioner, and indeed in all respects a sensible and excellent woman, I shall indulge my desire to translate the passage in which she describes her famous medicine; thinking also that, perhaps, some American practitioner might wish to subject her remedy to the test of experiment. She says: "We should take then a quantity of iron-filings, any quantity, and put it into a crucible, such as goldsmiths use, which being placed among hot coals, the fire should be kept up until the crucible becomes as red-hot as the coals; when thus heated, let the heat be kept up for about a quarter of an hour, then take it off, and it will be quite black. It is next to be pulverized in a mortar until it is as fine as possible. To four drachms of this powder, add four drachms of cinnamon, sifted very fine: mix them well, and then take four ounces of sugar, and mix with it a little water; boil it into a syrup, and make it clear of scum. Then, little by little, add the powder, and stir it all the time until the process is finished. To test this, put a drop now and then on the edge of a plate, to see if it is sufficiently candied. As soon as it has become sufficiently done, pour the whole out upon a sheet of paper, and then work or beat it with a spatula, and make it into lozenges of convenient size."

There are a great many martial preparations.

Vallet's mass, which is the same article as the pil. ferri carb. of the *U. S. Pharmacopœia*, is a very serviceable thing, and the purple precipitated carbonate of iron is also one of great power, but not unapt to prove irritating to the stomach, especially in the extravagant doses commonly allowed—as a teaspoonful twice or thrice a day. The pills of Dr. Blaud, of Caux, have also acquired a great celebrity for their emmenagogue power. They consist of carbonate of iron, combined with sulphate of potash.

The muriatic tincture of iron has likewise been much employed—as has also the combination of iodine with iron.

Now, as, in the exhibition of ferruginous medicines, it is understood that the iron is the therapeutical agent on which reliance is placed, there seems to me little advantage in exhibiting it in combination with any particular acid, since it is to be supposed that such combinations are immediately dissolved and new relations established with the metallic base, in the stomach. Hence, I greatly prefer to administer the article in its metallic form; and, thanks to the ingenuity of Messrs. Quêvenne and Miquelard, of La Pitié hospital, at Paris, we are favored with an impalpable powder of iron, that is prompt to enter into chemical union with the acids of the digestive canal.

This beautiful agent, which is produced by passing a current of hydrogen over peroxide of iron heated to redness in a porcelain tube, is a microscopic powder of iron—since the hydrogen, having united with the oxygen of the peroxide to form water, has left the iron pure and uncombined. It is prepared at Paris by M. Quésnesville, the successor of Messrs. Pellétier and Caventou, and sold by the importers and apothecaries in this country.

My own custom is to exhibit it in the form of pills weighing two grains, and I habitually direct the patient to take one of the pills very soon after each daily meal. If swallowed while the stomach is engaged in the act of digestion, it does not occasion any unpleasant sensation; and it is present and in readiness for any salifying acid that happens to result during the chymification of the food.

It is both inodorous and tasteless, and may be used without danger during an indefinite series of days, or weeks, or months.

No doubt rests upon my mind that it is the most powerful, safest, and least disagreeable tonic drug that the therapeutist can prescribe for the amenorrhœas depending upon a principle of anæmia—the most ordinary principle of those maladies. I ought to add that my attention was attracted to it by M. Raciborski's work *sur la Ponte Périodique*, and that it is to him I am first indebted for the practical advantages I have received from this medicine, and which induced me to take measures to introduce it into the practice in this country. The consumption of the article is already become very great, and will, without any doubt, become much greater—so as to supersede the other martial medicines.

In addition to the doses of iron used as above, it is necessary for the patient to observe certain rules as to the action of the bowels, which cannot be expected, under the imperfect and irregular extrication of biotic force of the anæmical girl, to be exact and orderly as in persons in health.

Medicines, of which the basis is aloes, are particularly adapted to such cases. The elixir proprietatis; the pill of aloes and rhubarb; the pill called Lady Webster's or English dinner-pill; the tinctura sacra, and a variety of such formulas, afford the opportunity for selecting preparations that may seem best suited to the existing indications.

Acescent food is the cause of much digestive distress. The acescent vegetables and fruits ought, therefore, to be eschewed, and, indeed, a considerable proportion of the food should be taken from the animal kingdom. Brown meats and game are preferable. A roast chicken, or roast beef or mutton, is preferable to other kinds of market provision, and it is, when practicable, useful to cause the patient to take a portion of meat at breakfast and tea, as well as at dinner.

Hot drinks, as coffee, tea, and chocolate, or cocoa, are debilitating to the already feeble powers of the stomach. When such articles ought not to be allowed, the patient can take claret and water, with meat and bread, and butter and eggs, for the breakfast, often with signal advantage. But the wine should be pure and unadulterated with brandy, which is so commonly added to every cask of claret sent to the United States for sale. Good Bordeaux wine, *non frêlaté*, that is, not brandied, makes an admirable substitute for boiling tea, coffee, and chocolate, which, though they may not sensibly injure persons in strong health, are yet surely unsuitable to the feeble and attenuated female. The claret should be sufficiently diluted. I think that a wineglass full and a half of claret, in a common tumbler of water, is not too strong a mixture even for a delicate girl.

There is no health without exercise and light. The patient should be much in the open air, exposed to solar light, when not too intense. She should reinforce the powers of the circulation by means of exercise. The best exercise is active, not passive exercise. But I dare not devote these pages to an extended discussion of this subject. I have, in my seventh and twenty-seventh *Letters to the Class*, pretty clearly stated my views on the topic, and refer the Student to those Letters.

CHAPTER VIII.

PREGNANCY.

Pregnancy.—The subject of pregnancy is one that is worthy of the most careful study by those who intend to devote themselves to the pursuits of Obstetricy, and, indeed, it merits the attention of all persons desirous to become acquainted with those miraculous powers and actions of the living body that result in forming and perfecting a human being, the crowning-work of the Deity in creation, who thus ordains man to come forth from the darkness of non-entity, to shine upon the stage of the world, and there act his part in the great drama of the living world.

There have appeared a great many speculations and theories upon the subject of Generation; yet, however ingenious or inventive their authors, or however eloquent or argumentative in urging the adoption of their peculiar views, there still remains a *terra incognita* of Embryogeny, which human sagacity, perseverance, and toil have never been able to explore; and which seems purposely set beyond the reach of the utmost ken of human wisdom or learning.

It must ever, we should think, remain impossible for man to comprehend the secret mysteries of those proximate causes, by the force of which a non-existent, or formless being is drawn forth of the dark sources of time, and launched out on the boundless ocean of eternity; made partaker of a prospective immortality; charged with the burden of responsibilities to God and his fellow-creatures; and bound by numerous relations to the physical world, of which he has also become a part by the very fact of his entrance into a moral state. Such a subject, nevertheless, cannot fail to prove interesting to the Medical Student, whether he approaches it in view of its physiological connections, or whether he wishes to investigate it as a psychological inquiry of the utmost importance in any system of moral philosophy. What subject, indeed, could be more replete with interest than one which pretends or seeks to explain all the changes that are experienced by the embryo, from its first discoverable estate as a drop of pellucid lymph, up to the time when it comes forth into the world endowed with all the powers that are appropriate to a healthy, full-grown fœtus at term! Such a study involves a comparison of its organs with those of all other living creatures as well as those of the adult animal, and a complete history of their development and growth; and it ought also to comprise an account of the accidents and diseases to which it is liable, with a full detail of all the peculiarities of the ovum and its several parts, and a comparison of them with the similar parts in various animals. The subject comprises, therefore, a vast field of physiology, which might be profitably explored by the curious Student; but the limits of this work are too confined to admit of it being treated of at length on this occasion.

If, as has been eloquently said, the springing up of a blade of grass from the bosom of the earth is calculated to fill the mind with wonder and amazement, what far more vivid impressions of the miraculous power of God are likely to be made upon those who contemplate the unfolding of those organs and faculties, by means of which man learns not only to know and acknowledge his Maker, but to render himself, as it were, a still more fitting image of Him, by the cultivation of the faculties that have justly given him the title of the lord of creation!

In addition to the interest as a merely philosophical study with which our subject is clothed, it appears to me indispensable that the Medical Student should make himself acquainted with it, as taught in past times as well as at the present era, and that he should aim to obtain a thorough knowledge of the subject, knowledge which can alone fit him for the conduct of cases in midwifery. But, let him consider whether, in aiming at this so called practical knowledge, he is not also called upon to make himself master of all those scholarly acquirements which can shed a light of revelation upon the dark and doubtful questions that in his practice he must not only solve, but instantly solve. To know that a pregnant woman has a child in the womb, and to learn by rote something of the presentations, positions, and manœuvres relative to the midwifery operation, is but a vulgar knowledge, common to old women and to physicians who confine themselves to the study of text-books and the unrecorded and misunderstood experience of their own clinical operations. The Student ought to study the subject not merely as a midwifery qualification, but as an Obstetric Science, the possession of which places him in the fore front of his professional rank.

Pregnancy is the developing of an embryo or fœtus in the womb.

An account of pregnancy comprises a relation of all the changes that take place in the reproductive organs, and in the whole economy of the female, from conception to the end of the puerperal state, as well as a history of the development of the fœtus.

It is proper, however, for convenience sake, to separate the account of pregnancy and embryogeny from that of parturition, which in itself presents a great and imposing subject of study.

Inasmuch as there are, besides natural or healthful pregnancies, cases to be met with of morbid or preternatural pregnancies, the latter merit a proper share of consideration. Hence, we ought to inquire not only into the physiological, but into the pathological conditions that are brought about by pregnancy, and learn the seat, nature, causes, signs, and cure of many troublesome disorders and dangerous accidents that overtake the gravid woman.

Fecundation.—In order that a woman may become pregnant, it is necessary that a germ, matured in one of the ovaries, should be expelled from its Graafian follicle, and then fecundated by the encounter of it with the male sexual element, the sperm or seed. I have already shown that the germ is contained within an ovum or egg; which the woman, like all other reproductive animals, matures and spontaneously discharges at regular periods.

I shall by no means pretend to show what is the nature of the mutual influences of the seed and the ovum, or which it is of the two that in this generative encounter furnishes the nucleole of the new entity about to start on the career of development. These are mysteries beyond human ken, and likely ever so to remain. It is in the mean time unquestionable that the concurrence of two different sytems of genital organs is indispensable; that one of them must be female, ovaric, or germiferous, and the other male, yielding spermzoons and a fluid with peculiar properties. Neither the female nor the male is endowed with the independent power of reproduction. It is usually admitted that the female yields the germ, and the male a material which, upon some combination or contact with the germ, imparts to it the power to grow or augment in a certain ratio, and only in given and rigorously predetermined forms. The ovulum discharged from the maternal ovary, though alive, is not generically alive; it cannot evolve either form or substance beyond its present stage; it is as yet unfecundated; fecundation renders it at once capable of generical evolution. To fecundate is, therefore, to impart generic force. Is this induction the act of the male alone, or of both male and female? Perhaps it is better to regard the ovulum as a cell, and the seed as the product of a cell; for the seed is originally a cell whose rupture or disintegration sets at liberty the fascicles of spermzoons that are produced within them. In this view, both the female and the male furnish each a cell.

Without desiring to call in question this opinion as to the germiferous nature of the female, an opinion which I cannot but adopt, I may avail myself of the occasion to advert to the opinion set forth by M. Schleiden, that the developing matter of the embryo plant—its primordial solid—is contributed by the male organ of the vegetable. Mr. S. shows that the pollen tube is a series of cells propagated from the pollen grain; that the pollen tube shoots its terminal cell into the ovary of the plant; and that a pollen-cell, making use of the cytoblastema within the ovary, the medium in which it is now placed, begins the career of the new vegetable, plant, or tree.

In this view, the terminal cell of the pollen tube is the germ, and the anther which yields the pollen grain is a female, not a male organ. For that which produces the germ is female. But, even if M. Schleiden is correct in his views, the dogma is not overthrown—naturalists have merely mistaken the sexual characters of plants, calling those female that are male, and *vice versâ*.

At the present day, it is not doubted that the woman produces the germ by the force of her ovarian stroma; yet it is not long since it was contended that a zoosperm, or spermatic animalcule conveyed to the surface of the ovary, and entering in at a pore, finds a nidus or matrix therein, for its early morphological operations, being thus the starting-point of the embryogenic processes.

No doubt exists as to the cell-nature of the ovulum of the mammals —and there is some reason to believe in the cell-nature even of the spermzoon. If they be equally cells, which hath the pre-eminence, or which is the true germ? and where is the philosopher that can, with absolute assurance, declare which of these cells is the primal solid in the generic or fecundative processes?

I freely acknowledge my own ignorance of the essential nature of fecundation.

Fecundation is not conception—a woman may have within her organs a fecundated ovulum, without having conceived.

Conception.—A fecundated ovulum entering into the womb through the Fallopian tube, and falling without delay into the vagina, may be destroyed or lost before conception can take place. It may be washed away in a torrent of blood, or carried off amidst a quantity of mucus. In such case, the woman has been fecundated, but she has failed to conceive.

An ovum may suffer the encounter with the male element even in the infundibulum or fimbria of the tube, and falling out into the cavity of the pelvis or belly, be wholly lost, from not making its attachment to the serous surface on which it has fallen; or, if attached, it might give rise to a ventral pregnancy.

Conception is the fixation of a fecundated ovum upon the living surface of the mother; it is the formation of an attachment to or union with the womb, the tube, &c., of the mother. This is conception, viz., the fixation of a fecundated ovum. If conception take place in the womb, it is pregnancy; if out of the womb, it is extra-uterine pregnancy; in the Fallopian tube, tubal pregnancy; in the ovarium, ovaric pregnancy; in the pelvis or belly, abdominal or ventral pregnancy; if it occur in the substance of the wall of the womb, it is called interstitial pregnancy.

Commencement of pregnancy.—Pregnancy ordinarily begins soon after the disappearance of a periodical effusion of the menstrua.

Several days, probably, always elapse betwixt the act of fecundation and that of conception. The ovum, in the mean time, by means of endosmose, is augmenting in volume and undergoing important changes in the arrangement and mixt of its constituent elements; changes that are requisite to fit it for the higher act of forming its attachment to the mother, which is conception.

It is not precisely known how many days ordinarily elapse between the end of the process of ovulation and fecundation, and that of conception. M. Velpeau seems to entertain doubts as to the four ova he describes at page 25 of his *Embryologie*, and which were from eight to twelve days old. It is not known how long they had been in the womb before their expulsion. Probably, Sir Everard Home's specimen, described in the *Lond. Phil. Trans.*, was an embryo of seven days.

The facts seem to concur in proving that, shortly after the act of fecundation, the conception takes place; but it is probable that the time is various.

As menstruation coincides with the periodical act of ovulation, and as the sexual embrace is attended with the orgasm whether gravidity follows it or not, there is great reason to suspect that the coitus of the sexes is frequently followed by fecundation of ova that are subsequently lost by effluxion, and it is to the last degree improbable that every fecundated ovum shall be able to effect its mesenteric attachment or fixation.

Fecundation and conception can take place only after the dehiscence and discharge of the Graafian follicle whose ovulum, but for the aphrodisiac orgasm, must necessarily be lost; for, unless the orgasm should occur, the fimbria of the Fallopian tube cannot be placed upon the ovary: the tube lies flaccid in the pelvis except when erected by the orgasm.

It is not known how long after the close of a menstruation the ovum continues fit for and liable to fecundation. Our researches, which clearly prove that an ovum is discharged with each menstrual period, have not revealed to us the precise date of the dehiscence and discharge. I am confident that the nearer to the close of the menstrua, the more probable is the fecundative result of a congress of the sexes. I possess one uterus, taken from a woman who died while menstruating, in which the dehiscence of the follicle and the escape of the ovum were already complete; so that, in this instance, I may venture to suppose that a fecundation would be more probable, the sooner the encounter of the elements after the close of the menstrua. Perhaps some women do go through the whole menstrual hemorrhage before the discharge of the ovum from the ovarian ovisac. M. Pouchet thinks that the egg retains its susceptibility to the male excitant for at least twelve days after the ovulation.

It is quite certain that it does retain its susceptibility for eight days; for, those Jewish women who remain under obedience to their Law, never admit of the embrace until eight days have passed after the last show of their uncleanness has disappeared. Other Jews construe the command as forbidding any intercourse until eight days after the first manifestation of the effusion.

To this effect I have been repeatedly informed by Jewish females, who had no ostensible motives to mislead me; so that I find a great religious sect serving to prove that fecundation of the ovulum is possible eight days at least subsequent to the drying up of the catamenia, which is probably more than eight days after the escape of the ovarian yelk, since I have never observed the uterus of a woman dying soon after the catamenia, in which the empty bloody crypt of the egglet was not visible.

Amidst the doubt and uncertainty that rest upon the subject, it must be regarded as scarcely possible to set a fixed term. Hippocrates and Galen, and most medical men, as well as most women, since them, believe that the sooner the sexual congress follows the menstruation, the more liable is the woman to conceive. It was, if this notion be true, a singular policy of the Jewish legislator, that pronounced such deadly reprobation upon all violators of the law of women's cleanness; and it seems to me a subject of surprise that the daughters of Abraham should, to this day, obey a custom calculated to obviate the greatest possible productiveness of their nation. The number of the Jews, at the date of the expatriation under the reign of Vespasian and Titus, was about 5,000,000 souls. There is reason to think that it has remained nearly stationary since the overthrow of their city by Titus. If the curious law of cleanness of women should be abrogated as to the Jewish wives, would the augmented chances of fecundation cause the sons of Abraham to become as the stars of the firmament, and the sands on the seashore for number? Is it the operation of this ancient law that has kept the population of the Jewish people down, through so many centuries, to one even tenor of about 5,000,000 souls?

I shall now insert a curious document received from a gentleman here, who was so obliging as to keep for me a careful record of the menstrual periods, the coitus, and the dates of birth—as in the annexed table.—It throws some light upon this subject.

June 6th, 1845.—Menstrual discharge ceased.
7th, Married—æt. 20 years, 5 months.
Mar. 11th, 1846.—Daughter born = 277 days, from June 7th to March 11th.
June 1st, 1847.—Abortion, at end of 1st month.
Aug. 18th, Menstrua appeared.
23d, " ceased.
24th, Coitus, coitus.
Sept. 21st, " "
22d, Appearance of menstrua—only a slight stain.
May 30th, 1848.—Daughter born = 268 days from August 23d to May 30th, child premature.
Aug. 6th, Menstrua.
11th, " ceased.
29th, Coitus—first.
Sept. 6th, Menstrua.
12th, " ceased.
25th, First coitus.
Feb. 14th, 1849.—Quickening.
July 26th, Son born = 282 days from September 12th to July 21st.

It is probable that ovulation may in some women shortly precede, while in the majority it absolutely coincides in point of time with, the first appearances of the hemorrhage, and no man has a right to say that the monthly hyperæmia may not sluggishly arise even one or more days after the escape has actually taken place, in some rare instances. As to the impression still entertained by some reputable authors, that the discharge of the ovule depends upon the aphrodisiac orgasm, it is too unreasonable an hypothesis; too unreasonable, I say, because, the dehiscence being the effect of absorptive power, and not of a lacerative or vulnerative force, it is idle to attribute to a momentary orgasm, which perhaps has no direct influence on the circulation within the ovaries, a result that requires for its effectuation many days of the slow operation of the absorbents of the ovarium. The regularity of the ovulative paroxysm is as great in the virgin as in the married woman; and is equally regular, moreover, in the vegetable as in the animal kingdom. It is much to be desired that careful observations of the state of the ovaries in persons dying just before, pending, or soon after the close of the monthly flow, should be laid before the profession in order that more accurate notions may be had upon the subject, and those gentlemen who should happen to enjoy opportunities of the kind, ought to receive the gratitude of their brethren for every item of such information accurately presented through the medical press.

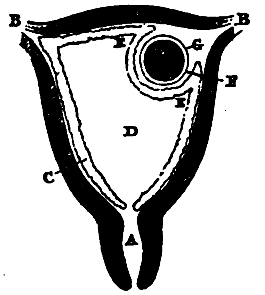
As to the precise place at which the encounter of the sexual elements takes place, we do know that it may, and sometimes does, occur in the Fallopian tube; and we have certain proofs of this in all the cases of tubal pregnancy, which are but too numerous in the records of Medicine. Possibly, it may likewise occur within the womb itself; and it may be hereafter ascertained that the instances of placenta prævia are the results of a late fecundation, which admits of the fixation of the product upon the os uteri internum.

The examples of ventral or abdominal pregnancy ought not to be taken as proof of an encounter of the male and female elements within the peritoneal sac. It is more reasonable to suppose that the encounter having taken place in the fimbria, the fecundated ovule, after falling out of the grasp of the infundibulum, has made its mesenteric attachment upon some point of the peritoneum on which it has rested.

As to ovarian pregnancies, I cannot deem them possible, except under the following circumstances. Both Bischoff and Martin Barry have found the zoosperm upon the surface of the ovary in animals killed immediately post coitû: this is sufficient proof that the prolific semen had been transported by the tube or cornu to the fimbria, whose grasp of the ovarium had deposited the zoosperms upon the ovarian indusium. If we suppose this transfer to be effected at the moment of the appearance, in the opened hila, of a mature ovule, it is clear the generative encounter would here take place, and the act of fecundation become complete. Upon some change of posture of the woman the further escape of the fecundated ovule might be now prevented, the pore being stopped by the pressure of a fold of broad ligament, a loop of intestine, or other obstructing cause; and thus the fecundated germ, imprisoned within its cell, might there commence its career of development, making of the ancient follicle, which produced it, its matrix or succedaneous womb up to the time at which it must inevitably burst. I am compelled to adopt this hypothesis; for I can by no means conceive that fecundation of a germ contained within an unopened Graafian follicle can possibly take place, as I fully adopt and believe Mr. Pouchet's doctrine as to the spontaneous discharge of the ovulum previously to the fecundation. I cannot believe that the male seed could enter into the ovisac, through not the peritoneum only, but through the albuginea and the concentric coats of the ovisac.

Decidua.—The womb is provided with a lining or coat, called the decidua or caduca. This caduca has been represented as a membrane excreted by the uterus as a means of securing the product of the conception, and affording to it a nidus in which to imbibe the earliest elements or pabulum for its growth.

Fig. 52.

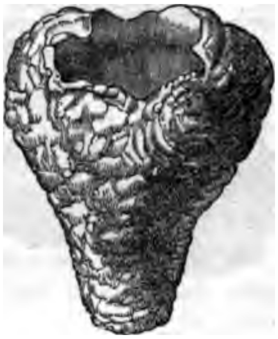


For a long time past it has been generally supposed that the womb, coincidently with the fecundative era, throws out a viscous excretion from its inner walls, so as to line or plaster the whole surface with the viscid matter. The cut is designed to show the manner in which this is supposed to occur. The dark, thick outlines represent the womb, already somewhat expanded by the growing ovum. A is the canal of the neck of the womb. B is the orifice of the left Fallopian tube, whose fellow is seen at the opposite angle. C is the decidua or caduca excreted by the inner surface of the womb, covering it as with a soft induitus. D is the vacant cavity of the uterus. E the same decidua or caduca, pushed off from the surface by the globule of the ovum G, which, as it increases in size, thrusts the decidua, or reflects it, as in the outlines, from E to E. It is this part to which the name of decidua reflexa, or caduca reflexa, has been given. F indicates the chorion or outer membrane of the ovum.

It often happens that women miscarry in the early stages of their pregnancy; and where the event occurs in the most favorable manner, the entire product of the gestation is thrust forth in an unbroken or perfect state. When this occurs, we find, upon examination, an oviform or pyriform body, upon the upper segment of which is seen a mass of tufted chorion, while the remainder consists of a dense and rather solid fleshy mass, which is the original or true decidua, called decidua vera. By careful manipulation it is possible to extract from the upper part of this mass the complete and perfect ovum, consisting of the chorion with its remaining tufts, inside of which chorion is the amnion, the water of the amnios, and the embryo.

A good notion of the appearance of the whole decidua after the extraction of the ovum, which has been taken out of the hole at the top of it, may be got by examining Fig. 53, which is pear-shaped. The pit or depression at the upper end, out of which the ovum was taken, is the reflected decidua, while the outer or pear-shaped object represents the decidua vera which filled the whole womb. It is clear that, if the ovum should continue to grow, and to reflect the decidua, or carry it before it, the decidua reflexa would at last come in contact with the inside of the decidua vera, be pressed against it, and that they would weld or solder together, so that, at length, it would be impossible to separate, or even distinguish them from each other.

Fig. 53.



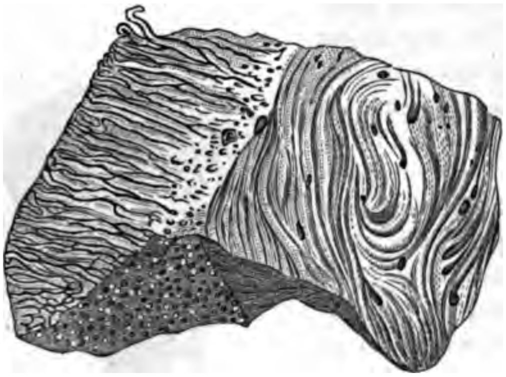
The cavity of the decidua vera, which at first was a closed sac, was, according to Breschet, filled originally with a fluid. Breschet gave to this liquor the denomination of hydro-perione. Of course, such hydro-perione must be removed in the process of reflection and ultimate fusion of the decidua reflexa and decidua vera. We shall find, further on, other opinions on this subject.

Such are the Hunterian views of the decidua. Other explanations of this product have been lately presented, which are, perhaps, more worthy of acceptance.

Many persons have heretofore disputed the existence of a mucous lining in the interior of the womb, contending that the corpus mucosum terminates within the os tincæ, and that the inner wall of the womb is peculiar, but not mucous. I presume no anatomist can be found, at the present day, to deny the existence of a mucous body of some sort, as composing the tissue of the inner paries of the organ.

In M. Coste's Atlas, already cited, are several beautiful engravings, representing magnified views of this texture, and among them, one which exhibits the appearances seen in a piece cut from the substance of the womb, on which is the inner lining membrane. I regret much that, from the design of this publication, it was not possible for me to give copies of those drawings. Mr. Gihon, however, has been very successful in copying the one annexed, which represents a magnified piece cut from the uterus.

Fig. 54.



The right hand portion of the picture represents the fibrous structure of the substance of the womb, while the left and under sides show the appearance, greatly magnified, of the lining membrane, which consists of tubes perpendicular to the surface. The orifices of these tubes cut off by the section, are seen at the inferior margin of the drawing.

I translate from page 208 of M. Coste's *Histoire Gén. et Part. du Dév. des Corps organ.*, the following portion of an article, which cannot but prove interesting to the reader of this work:—

"Upon examining the bodies of young girls dying suddenly, at the approach of a first menstrual period, or those of adult women who have perished by suicide while menstruating, I have found that among the Graafian vesicles of the ovaries there is always one of them decidedly more advanced than the rest. At the same time, the mucous body of the womb, phlogosed and of a turgescent appearance, in obedience to the laws of a pre-established harmony, is modified as it is in the mammifers during the season of the rut, and prepared for the reception of the ovule, whose spontaneous maturation is about to occasion its fall.

"While, indeed, the ovarian capsule that is about to burst becomes the seat of this rapid evolution, the vascular apparatus of the womb is coincidently developed and injected in an extraordinary manner; that of the mucous membrane especially, forms at the surface of the membrane, beneath the delicate layer of epithelium with which it is invested, an elegant network with irregularly lozenge-shaped meshes, each of which incloses the orifice of one of the innumerable glandular tubes of which it almost wholly consists. This vascular reticulation is so decided and so rich, that in certain subjects it communicates to the inner surface of the womb a more or less violet hue. In all probability it is through these delicate ramuscules, of which the network consists, that the menstrual blood oozes. In cases where a pregnancy has become somewhat advanced, and the ovum, lodged upon the mucous surface, has affected the mucous tissue so as to cause it to assume all the characteristic features of the caduca, these ramuscules become so greatly developed that many of them attain the size of a quill-barrel. A definite opinion may now be obtained of their real nature, and we may feel convinced that the major portion of this substance belongs to the venous system;—so that the mensual hemorrhage which they yield is evidently, in chief, derived from the reservoir of the black blood."

* * * * * * *

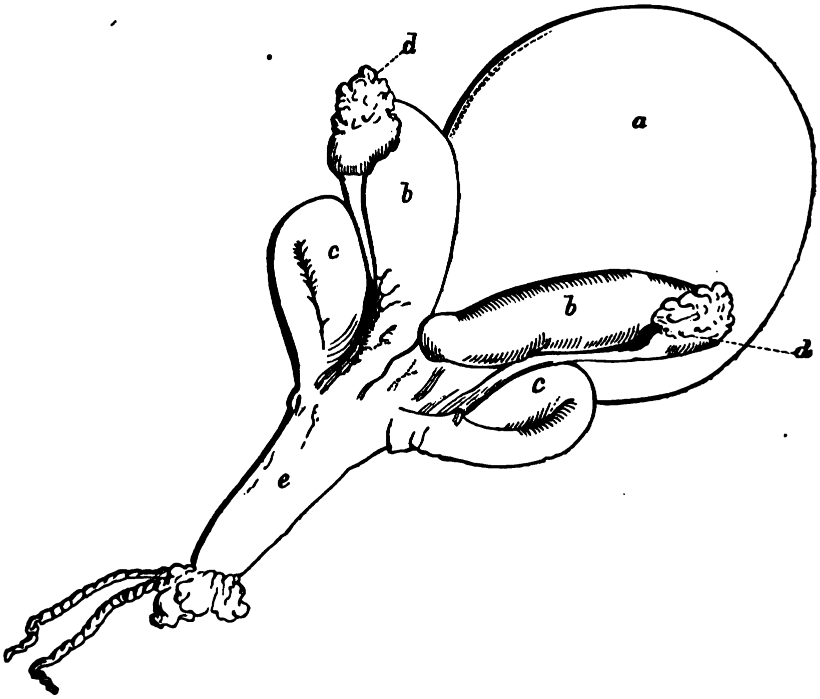
"These glandular tubes, one end of which is related to the muscular layer, while the other opens upon the free surface of the mucous membrane, are in number so considerable, that their orifices give to the surface the appearance of a strainer. Their presence in the tissue of the membrane increases its thickness to such a degree that, in many subjects, it forms plicæ, or elevated convolutions, that are soft, compressed, and so jammed together, as to leave no void space in the cavity of the womb. These convolutions, when the ovum descends from the tube, seize it and retain it by their contact or pressure. Upon inspecting the extraordinary thickness of this membrane, one might be led to suppose it the seat of a true pathological hypertrophy, or other alteration, were it not that repeated experience, corroborated by the examination of the parts, in women dying of accidents at the commencement of pregnancy, afford us the undeniable proofs of its being a normal condition of things."

M. Coste's engravings give very beautiful illustrations of the assertions of the above paragraph, and I have the pleasure to bear witness to the fidelity of at least one of his pictures, of which he presented me with an engraved and colored copy while I was in Paris in 1845. Not only was that engraving a most faithful copy of the water-color drawing, but M. Coste had the kindness to show me the anatomical specimen from which the drawing was made. It is impossible for art to give a more perfect representation of an object. These views of the nature of the decidua seem to meet the concurrence of the author of an excellent work on midwifery, now in process of publication in Germany.

I allude to *Die Geburtskunde, &c.*, by Franz A. Kiwisch Ritter von Rotterau: *Erlangen*, 1851. This author regards the *decidua vera* as a hypertrophy of the tubular tissue described by Goodsir and others, with modifications affecting the epithelium of the womb. The drawing in his Atlas gives a clear idea of his notion as to the manner in which the ovulum, once imbedded betwixt two folds of the hypertrophied membrane, clothes itself with a decidua reflexa.

I beg to remark that, however strongly I am led to adopt M. Coste's explanation, I feel some difficulty in accepting it, because I cannot readily comprehend how, after all this tubular structure is once thrown off as a decidua, it can ever be reproduced for the service of subsequent pregnancies. This tubular tissue must be regarded as an organ, complete in all its essential elements, and if it is in fact wholly deciduous and lost with each labor or abortion, then it presents an example

Fig. 55.



of a complete organ, reproduced in the most elevated of the mammals; a thing which is, I believe, without analogy in the higher series of warm-blooded animals.

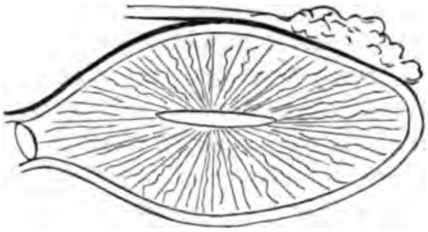
In the course of the researches that I made in the years 1847–8, upon the reproduction of the Opossum, I had occasion to examine the uteri of many of those animals both in the gravid and non-gravid state. I present to the reader an outline drawing of the uro-genital apparatus of that singular animal, which is a monotreme. In figure 55, *a* is the urinary bladder; *b b*, the first wombs; *c c*, the secondary wombs; *d d*, the ovaria; *e*, the uro-genital sinus along the surface of which (*e*) lay the rectum. The sinus uro-genitalis and the rectum united in a cloaca or monotrematous sac, which, as in the birds, gave outlet to the products of digestion, urination, and conception.

I examined this animal on the 3d of April, 1847, and found seven marsupial embryons in the pouch, which, from their size, I have reason to suppose must have come into the marsupium about the 10th of March, as they compare with my specimens of the 7th of March.

This figure represents the bladder, wombs, and sinus, inflated by the blowpipe. The wombs *b b*, when the animal is in rut, become twice or nearly thrice as large as they are in the figure; and the increased magnitude depends solely upon the development of the mucous tubuli, of which M. Coste speaks in the above quotation. The cavity is very minute—bean-shaped, and filled with an apparently slimy matter.

In an opossum examined last winter, there being present Drs. J. Wallace and E. Wallace, the aorta was injected with size colored with vermilion. Much of the injection was found to be effused into the small bean-shaped cavity of the wombs *b b*; but there were a great multitude of straight tubuli standing vertically to the paries of the womb, that were filled with the red injection, presenting the appearance of waiving, or straight red lines, passing from the inner superficies of the substance of the womb down through the soft deciduous matter to the inner delimitation of it. The cut, Fig. 56, gives a pretty correct view of the appearances presented upon cutting one of the wombs open in its longitudinal diameter. The lenticular-shaped cavity is seen in it as well as the converging tubuli. It gives also a good idea of the thickness of the uterine walls, compared with the accidentally developed interior muco-tubular membrane. On the exterior of the womb is seen the ovary, with part of its vector, or Fallopian tube. I think no one who has examined M. Coste's engraving of the gravid womb, opened,

Fig. 56.



can fail to be struck with the immense comparative development of the uterine tubuli during the rut in the opossum. It is among the apparent slimes of this texture that the Rev. Dr. Bachman, of Charleston, S. C., found the young embryons moving—as expressed in his paper to the Philad. Acad. of Natural Sciences, 1848.

I in vain searched for such free embryos in the numerous specimens of Didelphis in rut that I examined with the Drs. Wallace.

There is one circumstance that ought not to be overlooked by the Student while making up his settled opinion as to the decidua. It is this: In the solidungula, the pachydermata, and the cetacea, the whole exterior surface of the chorion becomes placenta; for the placental tufts are processes from the exterior surface of the chorion, to use the words of Professor Owen. In all these animals, it is impossible to conceive of a decidua reflexa; and it is equally difficult to admit of a decidua vera to which the whole exterior surface of the chorion could affix itself. Ought not the Student, then, to pause and consider whether this great and very general fact in embryology does not afford one of the strongest sanctions of M. Coste's views of the original organic nature of the decidua? The means by which ends are produced, in nature, are always few; and as the uterine products in all the other mammals are formed without the intervention of a Hunterian decidua, it seems on that account probable it could not be indispensable in human embryogeny.

I leave it to the Student therefore to judge for himself, as to the nature of the deciduous coat of the womb; and to decide betwixt the Hunterian explanation of it, already given, and the new doctrine, of which he has here the sufficient elements for the end of making up his opinion.

The ovum, after reaching the uterine cavity, grows rapidly. At first, it must be supposed to augment in consequence of an act of endosmose, which conveys to its interior the cytoblastema that it finds in the mucous fluids amidst which it exists.

Gradually developing its substance by means of changes in the vitellary mass that attends it, and also, probably, by means of the pabulum it finds in the mucus by which it is surrounded, it soon commences the acts of evolution of its parts. This process is effected by sending forth to all its parts, by means of the ventricles of the heart, the sanguine materials which it creates in order that it may be so converted. As the foundations of the tissues are being built up in these histological deposits, the nervous mass is everywhere deposited among them, and is in fact their essential element. This nervous mass, in the form of nervous molecules, fibrils, and cords, like all the rest of the solids, is derived from the blood; for nothing is truer than Oken's assertion, that "the blood is the fluid body, and the body the fixed and rigid blood"—so that the whole of the developments of the embryo and fœtus come to be at last the results of organic deposits, derived from its blood alone.

The embryo requires an engine for the circulation of its blood. Hence the features of the heart become so early disclosed—the path of the aorta is laid out by the blood itself; and the omphalo-mesenteric vessels are traced in order that the functions of the umbilical vesicle may not too soon fail.

The aorta divides, as it grows longer, into two branches, which are not two primitive iliacs, but two umbilical arteries, designed to send the blood of the embryo to circulate near the mother's blood, and to take from it the quantity of oxygen requisite for its aëration, and a certain plasma which it brings back to the body of the embryo. These two umbilical arteries after some time give off branches which become, at length, sufficiently large to be easily demonstrated as the external iliacs, the femorals, the popliteals, &c., for the vessels of the limb which are productions from the umbilicals, and at last assume their permanent character as iliacs, femorals, popliteals, &c. The blood of the embryo, by the extension of its umbilical vessels, comes at last to circulate among the cellular mass that is developed on the outer surface of the chorion, amidst which it receives its supplies of oxygen and also its alible elements. So that it is true to say, along with Professor Owen, that a placenta is a fleshy and vascular process from the exterior surface of the chorion.

As the embryo becomes at last enclosed within its amnion, chorion, decidua reflexa, and decidua uterina, it cannot be considered, of itself, to have any contact with the maternal surfaces—nor has it any connection with the mother, save by its vessels and blood alone, which it sends forth, projecting it, so to speak, far beyond the limits of its own body, in the distal tufts of the branches of its umbilical vessels, to spread it upon the living wall of its mother's tissues, there to receive its endowment of oxygen.

The only part of the child that really touches the mother is the blood of the child.

The embryonal blood, having traversed the capillary system of the placental tufts, returns by the channels of the umbilical veins. All the umbilical venules, in their inchoate state, have, probably, the power of taking up, by endosmose or absorption, some species of plasma or cytoblastema, from the maternal surfaces. They convey this, together with the aërated blood of the umbilical capillaries, into the single tube of the umbilical vein, which delivers it over to the child, by pouring it partly into the hepatic porta, and partly into the inferior cava by way of the ductus venosus, which is nothing more nor less than the continued tube of the umbilical vein.

In speaking of the absorptive power on the placental venules, I do not wish to be considered as asserting a power of absorption like that of the lacteal and lymphatic apparatus. I mention the fact—and I do not state that the act is done by any other than the endosmose power; for I do not venture to suppose the existence of regular absorbent vessels in the mass of the placenta, where no efforts have yet succeeded in making them manifest. Professor Liebig's Researches on the motion of the Juices in the animal body may be one's sufficient warrant to believe that the placenta can take up from the maternal tissues an amount of organic material adequate to the development of the uterine embryo and fœtus.

While the embryo is growing, the amnios continues to fill with larger and still larger quantities of water, the placenta increases in size, and the womb, which affords a nidus for the tender young, augments *pari passû* with the ovum and its contents.

The womb yields to the antagonistic force of the expanding ovum. It undergoes a compulsory hypertrophic development. The womb always resists this expanding power; it makes daily and perhaps hourly efforts to cast forth the burden from its cavity.

But the ovum commences its career of development in the cavity of the womb, which is composed of the wall of the fundus and corpus uteri.

The long cylindrical cervix is not, at first, interested in the struggle or contest between the expanding ovum and the resisting cavity. It stands as the guardian of the fruit of the conception. The cervix uteri is the seat of what the ancients called the *facultas retentrix*, and it continues superior in force to the *facultas expultrix* until the close of pregnancy, when, being exhausted, the facultas expultrix acquires sole dominion, and labor commences.

If at any time, during the course of a pregnancy, the retentive power of the cervix should fail, the expulsive power of the fundus and corpus uteri immediately begins to expel the ovum.

Many of the abortions that we meet with are caused by the weakness of the womb—that is to say, by the weakness of the cervix uteri, which gradually yields to the antagonizing contraction of the body and fundus, and allows the ovum to come forth and be lost. The physician makes use of this principle in the treatment of cases in which the indication is plain to bring on premature labor. If he dilates the canal of the cervix with his finger, or with a sponge tent, he takes away the facultas retentrix, and the ovum comes off.

It is curious to observe the care and providence with which the retentive faculty is fortified in certain of the tribes of creatures. In the cetacea, for example, there is a double cervix, a double os uteri, one within the other, so that one of them being dilated leaves the other still undilated and capable of resisting the antagonism of the fundus until the last moment of uterine gestation is accomplished. See a paper on the reproductive organs of Delphinus nesarnak, in the *Transactions* of the Acad. of Nat. Sciences of Philad., with engravings, by C. D. Meigs.

While the uterus is thus the reluctant servant of the forces of the ovum, it gradually increases in volume and weight, as well as in the cubic content of its cavity. After labor, it weighs a pound and a half; in the non-gravid state, it weighs two ounces and a half. It follows, therefore, that, in the course of a gestation, a vast increment of its mass takes place, and that this whole sum consists in living organic molecules, whether fluid or solid, that are deposited within its limits and become constituents of them.

Under what power is it that so great a mutation is effected?

There is no other mode to explain it than by reference to the augmented intenseness of the action of its nervous mass, compelling the nutritive operations at the expense of the blood brought into it by the uterine and spermatic vessels; for Oken says, truly, that the blood is the fluid body, and the body the fixed and rigid blood.

I shall not endeavor to give the rationale of the influence exercised upon this nervous mass by the growing ovum. Perhaps John Hunter would ascribe it to the stimulus of distension. Suffice it for me to say, that at any time in the course of the whole career, that career may, by the physician, be instantly arrested, and brought to a speedy close, by destroying or withdrawing the ovum, or by taking away the retentive power of the cervix uteri; for, to discharge the waters of the amnios by puncture, to dilate the canal of the cervix with a sponge-tent, or to energize immoderately the facultas expultrix of the fundus and corpus uteri by means of ergot, is to arrest and bring to a close the whole operations of the reproductive processes.

But, as the womb grows larger, its arteries and veins become elongated—their coats become more considerable in size and weight. The nerves are enlarged, or, at least, they are extended or *produced*. The absorbents, in like manner, are augmented, and, more than all, the great masses of muscular tissue existing in the virgin womb *in potentiâ*, rather than in reality, acquire a visible and palpable magnitude and a great force.

As the womb expands, driven outwards in every dimension from its centre, its walls do not diminish in thickness, although they become softer and more succulent. Torrents of blood circulate in the tortuous branches of the uterine arteries, and soak along in the immense sinuses and veins, some of which are large enough freely to admit a finger within their cavities.

In the development of the veins of the gravid womb, the fibrous coats of them do not appear to undergo much change or addition. It is the lining membrane, the endangium, that is chiefly increased, *pari passû*, with the augmentation of the calibre of the vessels, so that, in examining the gravid womb, one sees rather great holes and channels lined with a smooth endangium, running among the tissue, than ordinary veins. In this respect there is nothing peculiar to the womb, since it has been long known that the veins within a viscus consist only of the endangium, as must indeed have been the case in the earliest stages of development, even of the aorta itself, for the blood makes its own channel. It makes, therefore, its endangium first, and the more tough, fibrous, and elastic parts of the tubes afterwards. See Raciborski's paper on the veins in the *Transactions* of the Roy. Acad. Medicine.

From the foregoing, it appears that the augmentation in weight, volume, and capacity of the gravid womb, is a compulsory process under an antagonistic force applied and sustained by the developing ovum. The ovum may be compared to a powerful acephalocyst that attaches itself by means of its placental mass, serving as its suctorial organ, to the living wall of the womb, which it compels to yield in every dimension for its growing wants of accommodation. I beg the Student to see, in this great change of the womb from its non-gravid weight of two ounces to its gravid weight, at term of one pound, or even one pound and a half, the proof of what I said a little while ago, *videl.*, that the uterus is subject to a physiological hypertrophy, from which it recovers as soon as the cause is removed; for, when the womb becomes emptied by the act of parturition, it returns within thirty or forty days to its non-gravid weight and size. The Student, in this, will see an example of an enormous hypertrophy produced in the course of two hundred and eighty days, and recovered from in the course of one month after the termination of the pregnancy. Let him reflect, therefore, that, if this is the law of the womb, it ought not to surprise him to learn that irritations, displacements, and various other causes may excite in the womb this same disposition to hypertrophy under which it grows rapidly larger and larger, but ceases to grow, and returns speedily to its normal size and weight very soon after the irritation, displacement, &c. are removed.

Though the womb increases in weight as the pregnancy proceeds, the means of its suspension in the cavity of the pelvis are always the same in the gravid as in the non-gravid state. It is to be expected, then, that, as the uterus becomes heavier, it shall sink somewhat lower down, and that the woman shall, if she be a susceptible creature, perceive some symptoms like those of a falling of the womb.

Although the womb is growing larger, the lower part of the abdomen does not at first become larger. On the contrary, the early sinking downwards of the womb causes the hypogastrium, in some cases, to be less protuberant than before the conception, and hence the French proverb,

"A ventre plât,
Enfant il y a."

These signs of falling of the womb in women who are married should be ever, by the physician, held as suspicious until he has full reason to believe that they are not results of an early pregnancy, and there is frequently no little embarrassment for him in coming to a positive conclusion. Even the vaginal taxis cannot, in all instances, give him an assured ground of opinion, since the engorgement of the uterus, so frequently coincident with its prolapsions, are with difficulty to be distinguished from the augmented volume of the same organ arising from gravidity.

The reproductive organs have a direct connection with the cerebro-spinal and the ganglionic system of innervations. There is, therefore, no part nor parcel of the economy, into relation with which it cannot, under certain states of health, be brought: they are among the most powerful disturbers of the complacency of the organisms. They constitute an imperium in imperio, whose behests are not to be disobeyed.

These organs can disturb the brain—the respiration—the digestion—the circulation—the secretions—the nutrition.

When the womb has become the seat of an advancing gestation, and feels the impulse of development, the complacency of the other innervations is decomposed. The stomach is one of the organs earliest to be callèd into sympathetic distress. The sympathy of the stomach is, in general, independent of any marked change of the temperature, and of the rate of the arterial pulse. It is expressed by anorexia—by nausea, and ofttimes by vomiting. Probably the salivation, which is also a common symptom in pregnancy, is one of the same category of disturbances—as is also the sore-mouth of pregnant and suckling women.

Multitudes of women suffer from nausea only in the morning hours, the sympathy being interrupted by the business, the preoccupation, and the fatigues of the day, to return again on the following morning and follow the same course. In others, the nausea is perpetual—and attended with the most obstinate vomiting.

A young woman, under my care, vomited very soon after the conception. She vomited every day, and many times daily during the whole course of her pregnancy. When her labor came on, which was a fierce one, her disposition to vomit was greatly aggravated with every renewal of the contractions. To such a height did this symptom rise that I found it seriously to contravene the intent and purpose of the labor pains. It is not a good practice, in general, to rupture the membranes of a primipara; but in this instance I concluded that, if the ovum could be allowed to discharge the waters, the condensation of the womb that would follow might put an end to the vomiting. I thrust my index finger through the distended bag of waters at the next pain. From that moment the nine-months' vomiting ceased, and returned no more. The labor, no longer delayed and contravened by the troublesome vomiting, hastened to a favorable conclusion.

I attended a lady in Spruce Street, a few years since, who, during nearly three consecutive months, appeared to vomit up every particle of her ingesta. It was her own opinion, coincided in by her friends and attendants, that the total amount of all her food and drinks returned very soon after they were swallowed. Although she felt much weakened, I could not perceive that, under this process, she lost her flesh, and in the end, she gave birth to a healthy daughter. It is apparent that she must have been nourished during this time; but the manner, and the quantity, have remained ever since a mystery that I cannot explain. I cite this as one case only out of a great number that have occurred in my practice.

In my *Letters on Woman, her Diseases and Remedies*, p. 504, is the account of a case of vomiting from pregnancy, which brought the woman's life into great peril. I made the first note of her case in my case-book, Sept. 18th, 1842. She had then been vomiting since the first days of April. She assured me she had vomited more than thirty times daily, and her mother, a prudent, sensible woman, said that she had vomited more than sixty times a-day. This vomiting ceased upon the use of large quantities of champagne. Upon some imprudences in exercise and diet, the vomiting returned at the end of a month and continued until the child was born. She was frightfully reduced—to such a degree, indeed, that at the eighth month I was nearly decided to bring on premature labor. Certain motives having dissuaded me from that step, she finally was delivered, and recovered her health.

Now, such a case of vomiting ought not, by the Student, to be regarded as a case of sympathetic disturbance of the stomach merely. It is true that the earliest manifestations of the gastric disorder are attributable to sympathy with the womb; but when the malady has attained so fearful a height, it becomes itself the primary consideration, and cannot be correctly explained but as an actual inflammation of the stomach and duodenum, with grave derangements of the circulation and secretions of the liver itself. This woman discharged immense quantities of brown, ropy mucus, often charged with red blood. The epithelium of the stomach and duodenum was unquestionably in many places removed, leaving the corpus mucosum bare, or raw.

If I had fulfilled my design to bring on a premature labor, I should not thereby, perhaps, have cured the gastro-enteritis; but, by removing another and considerable cause of constitutional disturbance, her constitution would have been earlier left at liberty to recal the gastro-duodenal and hepatic tissues to their wonted rates of vital activity. The woman did, in fact, recover soon after the birth of the child.

If the digestive organs are susceptible of such great deviations of their activity as those I have above mentioned, they will, *à fortiori*, be liable to slighter manifestations of derangement; such as acidity, eructations, flatulency, and irregular action of the bowels, either as costive or as subjects of diarrhœa.

Many of these troubles vanish while the woman takes exercise in her carriage or on foot; because, as before said, the powers of the constitution, when devoted to the purposes supposed in every case of active employment of them, are not liable to be checked and diverted by a morbid consent of the stomach with the womb. Hence such women should be advised to walk or ride, or to busy themselves with their affairs, and avoid a sedentary and slothful life.

The acidity and eructations, and the diarrhœa or costiveness of pregnancy, may be obviated by the use of alkalies, whether soda or potash, magnesia, lime, or ammonia. Some vigor may be communicated to the gastric innervations by means of champagne; or by brandy and water, rum and water, or by certain of the bitter spirituous tinctures, combined with aperients.

I readily cured a case of this sort, in the spring of 1848, in a person who had suffered great distress from vomiting, cardialgia, flatulency, and constipation. She had a mixture composed of sweet tincture of rhubarb two ounces, and tincture of gentian one ounce. A dessert-spoonful of this medicine, taken once a day, dissipated all the symptoms; and I assure the Student that, in many instances of severe distress from this vomiting, I have found the patients promptly relieved by its use. Two drops of tincture of aconite, in a tablespoonful of water, may be given for the dose, in certain of the cases, with marked relief.

Many of those examples that consist of nausea and vomiting during the early part of the day, but which cease after the meridian hour, may be set aside by the following method:—

Let a cup of coffee, with a toast, be brought to the bedside at the earliest morning hour. The patient should be called from her sleep to take this preliminary breakfast, without rising from bed. As soon as it is taken, let her lie down to sleep again, if possible. It appears useless to offer a rationale of this method. I am very confident, however, that, in a considerable number of persons, it will be found to put a sudden stop to the vomiting, as well as to the nausea. Certainly, many of my patients have been speedily, as well as permanently cured by it, and that in very distressing instances of the nausea.

Inasmuch as the gravidity of the womb enables it to disturb the alimentary organs in the manner above mentioned, it might reasonably be inferred that the rest of the nervous mass is also liable to interruption of its regular action, from similar causes. In regard to the temper and disposition of the woman, considerable modifications are sometimes observable. Those who are by nature amiable and gentle, sometimes become peevish, and fretted by trifles—full of false alarms and idle fears; while persons naturally ill-tempered become charitable, and kind, and courageous. Strange desires, longings, wishes for extraordinary, unprocurable, or disgusting kinds of aliment, are said to arise in pregnant women; but in a long clinical practice I have never met with any examples of the sort; which leads me to infer that these longings are more frequent in the books than in the practice of our art.

Quickening.—The child acquires a power of slight muscular motion at an early stage of pregnancy; but, as it is defended by the decidua and the membranes, and floats in an abundant liquor amnii, the first feeble motions of its body or limbs cannot make themselves felt through so many coverings, by the living tissue of the womb. In general, the embryo attains the age of four months and a half before it becomes sufficiently large and strong to make itself felt by the mother when thrusting with its feet or hands, or when suddenly redressing its body from its usually flexed position. When the child hath first acquired this power to make its motion felt by the mother, it is said to be quick with life, or to have quickened, and the event is called the quickening. Quickening is the first perceived motion of the child.

The lawyers have looked upon a child quick with life as worthy of the protection of the laws; for it is felony, maliciously, and with evil intent, to kill a child that is quick with life in the womb, but not felony to kill one that is not quick with life. It appears to me that there is here a distinction without a difference; for the child of six weeks or of two months is as essentially quick with life as one of five or seven, or even nine months. The only difference is, that the child at four or four and a half months, is strong enough to make itself felt, while at two or two and a half months its movements are so feeble as not to be perceptible by the mother. It is to be hoped that this barbarous and ignorant distinction, a remnant of early legislation, may be done away with by our modern legislatures, and that the wretches who for hire lend our art to the detestable baseness *teneros avellere fœtus*, may be made liable to condign punishment for the crime, committed at whatever stage of the gestation.

It was formerly proposed to explain this occurrence of quickening by supposing that the womb just at that time, having grown too large to remain in the cavity of the pelvis, suddenly escapes from it into the free abdomen above, and that the suddenness of its rise and intrusion is the cause of the first sensation. But I conceive that no one now adopts such an opinion. Women sometimes faint, upon quickening, which has been attributed to the sudden uprising of the womb from below the brim of the pelvis. I have not known any such instance, and if one should occur in my practice, I would attribute it to the psychical rather than to the physical shock.

Form of the Belly in Pregnancy.—As the ovum grows larger day by day, so doth the womb continue to expand, adding molecule to molecule, weight to weight, and mass to mass. The lower belly becomes visibly protuberant, and the swelling is fashioned upon the pear-shaped womb that lies beneath and pushes the belly outwards. The Student should remember that other bodies besides the womb may cause the abdomen to enlarge—but that no object save the uterus itself can give to the hypogaster its peculiar gravid shape. The form of the hypogastric tumor dependent on the state of gravidity furnishes to the physician, therefore, a very useful means of diagnosis, which ought not to be neglected in some of the difficult cases; cases in which it is a matter of extreme consequence to individuals that no mistake should be made as to the real nature of the symptoms.

Pouting of the navel.—The navel in the non-gravid woman is a deep depression or dimple. This depression is caused by the contraction or shortening of the remainders of the two umbilical arteries and veins which, after birth, draw the skin inwards and downwards to make the pit of the navel. In the gravid woman, when the six months are past, the navel rises to the general level of the skin—and, as the womb grows larger in its progress, the umbilicus protrudes, because the ligamentous remainders of the umbilical vessels, which are deployed with the rest of the teguments, can no longer draw it inwards. A pouting of the navel is, therefore, one of the consequences and signs of a pregnancy of six and more than six months' duration. Other tumors also make the navel to pout.

Cramps from Pregnancy.—Sometimes the gravid womb fills up by its bulk the cavity of the pelvis so as to produce cramps in the legs, by pressing too firmly upon and obstructing the sacral and obturator nerves. There is no remedy but patience and time.

Costiveness in Pregnancy. — When the womb has got fairly up into the cavity of the abdomen, it lies in front of the convolutions of the intestines: even the transverse colon lies rather behind the upper part of the fundus; so that when, in a gravid subject, the abdomen is laid open, nothing is to be seen but the uterus in front. The edge of the right lobe of the liver, or a segment of the greater curvature of the stomach, the omentum, and colon lie upon the top towards the reverse of the fundus uteri.

In this situation it is impossible for the bowels to receive, in the same manner and degree, the stimulating and natural succussions of the abdominal muscles, as they receive them under ordinary circumstances. Those succussions are constant provocatives to a healthful activity of the peristaltic force, and are essential thereto. The failure of them tends to render the peristaltic motion languid or torpid, and therefore costiveness is a very ordinary state in advanced pregnancy. Let the Student reflect upon the evil effects of such torpor, in overloading the alimentary tube with the undischarged residuum of the digestion, by which the tension of the abdomen is increased, and the mesenteric and hepatic circulations and innervations brought into disorder, and which ought to be corrected by the proper remedies.

Alternate Hardening and Relaxation of the Womb.—As the womb approaches nearer to its term of gestation, the retentive faculty grows gradually less, from the deploying of the upper part of the cervix, which becomes a part of the general cavity for the accommodation of the ovum. The expulsive faculty makes frequent efforts to overcome the remaining antagonism of the cervix. These efforts, which doubtless lend a chief aid in the act of deploying the cervix uteri, are to be detected in the alternate hardening and softening of the globe of the uterus under the hand placed upon the abdomen. If the hand be placed upon the abdomen of a pregnant woman, it may be that the impression will first be received of a great softness and pliability of the textures, but, upon keeping the palm *in sitû*, the tumor begins to grow harder and harder, until a very condensed condition of the organ is produced by this tonic contraction of its muscular tissue.

These contractions are not productive of the least pain or any disagreeable sensation, save a feeling which women designate as a "drawing" sensation. One feels surprised, sometimes, upon observing the very positive force of these contractions, to hear the woman say that they produce no pain in the back or hypogastrium; particularly as the same degree of hardening or contraction of the organ in a labor is accompanied with very decided pain. The reason of the difference is this—viz., the pains of labor are pains of the yielding but still resisting os and cervix; while these contractions, above described, do not cause any positive stretching and pain of those parts.

How the Cylindrical Neck becomes Conical.—These contractions are repeated very often during many weeks, and, indeed, it may be said they are reiterated throughout the whole duration of the pregnancy. The effect of them is gradually to reduce the cylindrical neck of the womb to the shape of a cone—or rather to the form of the lesser pole of an egg, and to make the os tincæ acquire a circular instead of its usual oblong or oval form, and to convert it into a dimple or pit in the apex of the now oviform uterus. When this dimple has become completely developed by the resolution of the cylindrical into the conoidal cervix, labor is ready to begin, and the next repetition of the contraction might justly be accounted as the first pain of the labor, for the labor pain is nothing else than contractions of the organ by which the expulsive faculty strives to overcome the retentive faculty, and thus free the uterus of its contents, by thrusting them forth into the vagina, and thence into the world.

Size of the Gravid Womb at Term.—The uterus, rising upwards in the cavity of the belly, finally attains the length of full twelve inches. I measured the gravid uterus at term, in an individual who died suddenly before the onset of labor, during the month of June, 1848. It was twelve inches long, and eight inches in transverse diameter. The broad ligaments rise, of course, as the womb rises; and the ligamenta rotunda, which, extending from the internal abdominal rings to the angles of the uterus, ought not, in a normal state, to be more than two and a half to three inches in length, by the mounting upwards of the uterus towards the scrobiculus cordis, at last acquire a length of five or six inches at least, serving to stay or steady the womb as it goes up, and, on occasions, to render it oblique to the right or left, in proportion as the right or left ligamentum rotundum is the readiest or the most reluctant to yield as the rising womb compels it to accompany the ascent.

State of the Ligaments in Pregnancy.—I call the attention of the Student to this condition of these ligaments, now, in order that he may in this connection clearly understand that, if the round ligaments should not diminish their own longitude *pari passû* with the lessening of that of the womb after labor, and if they should continue elongated, or weak and relaxed, after the womb has returned nearly to its non-gravid dimensions, then the womb, having no support to prevent it from falling backwards, will be liable to dip its fundus below the promontorium, and be overset backwards, or retroverted. Whenever this accident happens, it is attributable to a fault of the round ligaments, and to nothing else; since, with round ligaments two and a half inches in length, the fundus could not possibly retreat far enough from the symphysis pubis to admit of the state of retroversion. Let the Student early learn that one of the common accidents of the lying-in state is this very accident, the non-contraction of the ligamenta rotunda—and let him carefully estimate the effects, as to pelvic obstruction, pain, bearing down, and general disturbance of the health, likely to arise from such an accident. While he is ignorant of these simple facts in pathology, he will permit his patients to suffer needlessly; but, well informed on this point, he will surely obviate by his precautions much sore distress. The accident is by no means an uncommon one, after abortion at the third or fourth month. In such instances, and indeed always, when the woman is found to complain of pain in the back, and within the pelvis, with urinary and rectal tenesmus, and is confined to the bed instead of readily recovering, as she might be expected to do, a few days after the miscarriage, let the Student look to it, that he make a full exploration for the establishment of a sound diagnosis.

Development of the Embryo and Fœtus.—It is proper that I should now recur to the consideration of the development of the fœtus, and explain it as a part of the doctrine appertaining to the subject of pregnancy. In doing so, I cannot avoid speaking of the appendages of the fœtus, though the secundines, attached to the new being, and perhaps strictly to be considered a part of it, are in a degree to be regarded as an extrinsical and accidental, or transitory apparatus.

When the Graafian follicle, in completing the acts of ovulation, bursts and discharges its yelk into the infundibulum of the Fallopian tube, the ovulum falls off free, and is thenceforth unconnected with any part of the ovaric tissues. It is no more connected with the living parent that produced it, than is the bud that is carried by the gardener a dozen miles from its original stock to be inoculated into another tree; yet, like it, it is a living, independent, and vigorous being.

The ovulum passes along the canal of the Fallopian tube, augmenting as it goes by the imbibition of fluids in which it is bathed. The vector tube discharges it into the cavity of the womb, where the greater portion of its orb is enveloped in the deciduous mass or enclosed within the sulci of the swollen tubular membrane. At first it remains unattached, but in process of time becomes fixed to some point of the surface, the outer face of its tufted chorion attaching itself to the inner surface of the uterus. This fixation constitutes what is called conception. Conception is the FIXATION of the fecundated ovulum.

Probably the spongioles or tufts of the chorion insert themselves, like the roots of a plant in the soil, into the softish deciduous mass of the womb prepared for the purpose. It is only that segment of the orb of the ovum that looks directly towards the uterine wall which it touches, that preserves the tufts of the chorion which rise everywhere in equal abundance from the whole ball. The rest of the chorion, covered only by the decidua reflexa, soon loses its tufts, and becomes bald, smooth, and polished like a serous membrane, save here and there a few remaining tufts or spongioles that may be detected, in cases of abortion, as late as the fifth month; as in a sample in my collection, and as was the case in Wm. Hunter's specimen, described in his table x, fig. 4.

Placenta.—The nature of the connection thus formed is the subject of great differences of opinion, that have not been settled even by the authority of John Hunter, who first proposed a rational explanation of this difficult point, in his article on the placenta, which may be consulted in his volume of papers on the Animal Economy. According to Mr. Hunter, the placenta is a symmetrical organ, consisting of two parts, one derived from the womb and the other from the child.

Seiler, in his work *Die Gebaärmutter, und das Ei des Menschen*, stoutly denies that the placenta belongs to the mother; and Velpeau, in his *Ovologie ou Embryologie humaine*, p. 65, says: "Et j'ose affirmer avec plus d'assurance que jamais que le placenta humain est entièrement fœtal." I declare, with greater confidence than ever, that the human placenta is entirely fœtal.

While the celebrated Velpeau thus resolutely rejects the Hunterian doctrine that there is a uterine portion of the placenta, other very eminent persons equally insist that an important portion of the mass is actually derived from the womb; and that, whenever it is extruded by the contractions of the organ, not only is the fœtal portion expelled, but the whole of the uterine portion also, which is detached at the same time, comes off with the fœtal half; from which, indeed, there is afterwards no possibility of separating it, nor even of distinguishing them, the one from the other.

I here repeat the remark, that this is not pretended to take place in any animal except the human being; certainly not in the ruminants, in whom the uterine cotyledons and placentules separate completely from each other, the womb keeping its own organ, and the embryo carrying its portion away with it when expelled. I may here ask whether it is probable that so great a difference does really exist in the warm-blooded, respiring mammals, of which man is one species?

Prof. Owen, of London, is one of the distinguished naturalists who contend that the placenta is constituted of materials, part of which belong to the mother and part to the ovum. Mr. Owen says, after having carefully compared the Hunterian preparations with the results of his own examinations of the gravid uterus at full period, "I now believe they all fully bear out Mr. Hunter's general view, viz., that the maternal blood is diffused, by means of the tortuous arteries, into the spongy cellular substance of the placenta, where it bathes the capillaries of the fœtal circulation, and is returned by the oblique decidual adventitious sinuses and channels into the orifices of the uterine veins." *Vide* note in *Hunter on the Animal Economy*, p. 102.

M. Flourens, Professor of Comparative Physiology at the Jardin des

Plantes, says, in his *Cours sur la Génération*, p. 180, that the umbilical vessels of the mammifers, which everywhere pierce the chorion, in order to come at the internal surface of the womb, are called placentas. The placenta is an inherent characteristic of viviparous production. It cannot, therefore, exist in the oviparæ. Mr. F. divides the mammals into two great classes, one of which comprises man, the rodentia, and the carnivora; while in the other class are arranged the pachydermata, the solipedes, and the ruminantia. In the first class, he contends, there is a vascular inosculation of the mother's vessels with those of the ovum, whereas no trace of such vascular union can be detected in the second.

I have cited this distinguished physiologist in order to show his opinion; but I am far from advising the Student to adopt it upon his authority. His assertion that the placenta is a characteristic of viviparous production, is denied by high authority; and notwithstanding I am prompted to agree with him, I admit that the most careful research has never enabled me to discover the least trace of a placenta or cord in the early marsupial embryon, as I have stated in my paper on the Didelphis, in *Amer. Phil. Trans.*

Mr. Owen's assertion, in regard to these differences in the classes, is as follows: "Thus the placental intercommunication between the fœtus and mother, in the human subject and quadrumana, is carried on by the contact of the fœtal capillaries with maternal extravasated blood; while in the ruminants, the mare and the sow, it takes place by the apposition of capillaries to capillaries, and the two parts of the placenta, viz., fœtal and maternal, can be separated. In the ferræ and rodentia, there appears to be an intermediate structure." *Loc. cit.*

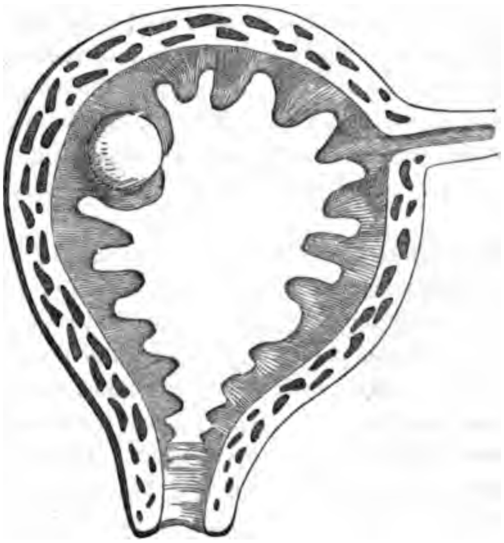
Let the Student, while pondering upon these propositions of Masters in our science, observe that, though the separation of the placenta in child-birth is essentially hemorrhagic, and not so in the parturition of the quadrupeds, which might lead to inferences in favor of a different plan of union, yet organs of such vital importance in the economy of the genera are not likely to be modeled upon plans absolutely different in creatures so nearly allied in their great types. In all the mammifers, there is one type for the brain and nerves, one for the respiration, one for the circulation, one for the absorption, secretion, reproduction, &c., and there should, *à fortiori*, be but one for the great and indispensable branchio-absorptive apparatus of the fœtus.

Fabricius ab Aquapendente says the chorion or the umbilical vessels, dispersed throughout the chorion, may be applied in two different ways, of which one is by the mutual inosculation of the terminal branches of the umbilical vessels with the uterine veins; and the other is by the termini of the umbilical vessels plunging into the fleshy substance, like roots into a soil. Fabricius, *Opera Omnia*, fol. p. 42; Lips., 1687.

Prof. Coste's views of the mode of attachment.—I had, as I have already said, an opportunity to examine some of M. Coste's preparations, as well as the drawings and engravings taken from them. I repeat, that the engravings are most faithful representations of what I saw, or seemed to see. His opinions as to the great increase of the tubular glands of the inner parts of the womb appear to be almost irresistible, yet I cannot free myself from some doubt as to the power of an organ like the womb to throw off, with each gestation, a whole glandular apparatus, which he regards as essential to both menstruation and conception; for I cannot discern the law or the force that should be able to reproduce or reinstate an organ so complete and important as that glandular membrane is.

But let us suppose M. Coste to be correct in his views, and let us consider the annexed figure as representing a section of a gravid womb, with an early ovum imbedded in one of the plicæ or folds of tubular membrane, then the ovulum, partly buried in one of the folds, plicæ,

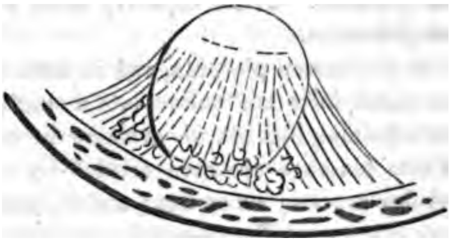
Fig. 57.



or rugæ of the tubular membrane, will sit on the basement tissue, or womb proper.

If an ovulum should thus be caught fixed and half buried between the rugæ, it might form its mesenteric attachment at the bottom of the fold, and daily increasing in size it might cause its decidua reflexa to grow thinner until it should at last wholly disappear. In some cases, the segment of the ovum that looks inwards to the cavity of the uterus, pierces through the thin coating of decidua, as in the figure annexed, and I have seen such an example.

Fig. 58.



I might devote many of these pages to a relation of the various conjectures and explanations contained in the Medical Library upon the subject of the utero-placental connection. The discussion between Eschricht and Weber—the elaborate researches of Breschet, of Velpeau, Flourens, Coste, Bischoff, Kiwisch, &c. &c., might afford abundant materials of citation; but, as I wish to give my own views as to a common question before the Republic of Letters, I prefer that the Student or Scholar should refer to those writers at first hand, and allow me meanwhile to express my own sentiments upon the points under consideration.

No one, I should suppose, can, for a moment, doubt that the placenta is the agent of nutritive absorption, at the same time that it affords to the embryo the sole means of its oxygenation; nor that oxygen is quite as essential as the alible material itself to the existence and growth of the ovum.

In order to the effectuation of these two prime branchio-absorptive objects, there must be contact of tissues belonging to the independent fœtus, with tissues of the parent; and as the fœtus itself is completely separated from the mother by its interposed chorion, amnion, decidua, and waters, it was necessary to develop an apparatus, by means of which to project its blood far beyond the limits of its own body into a system of placental capillaries. It is to be supposed that, in these capillaries, the blood gives off carbon and receives oxygen, either after the manner of lungs or branchiæ; and, at the same time, drinks in, by cell-endosmose, or by real absorption, the fluid materials, out of which to maintain and augment its own crasis and sum.

In this apparatus for projecting the blood of the fœtus beyond its bodily limits, and bringing it back again augmented and oxygenated, the aorta, as I have already said, divides into two umbilical vessels, which, running outwards along the cord, subdivide at the extremities into myriads of arterioles and capillaries, which, constituting numerous tufts or branches connected together by a loose cellular tissue, is called the placenta. These capillary tufts, wherever they may be attached, are placentas.

In the human placenta, and in those of certain quadrupeds, all these placental tufts are united into a single disk, cake, or placenta, as in the adjoining Fig. 59, which shows the uterine surface, where the lobules of the placenta are seen divided by the lines of the septa. These lobules are very numerous; and if, instead of being assembled in one disk, they were disseminated over various parts of the womb, the analogy to the ruminant organ would be complete. Fig. 60 exhibits the fœtal surface of the placenta. The umbilical cord, containing its two arteries and its vein, is seen reaching the placenta at its centre, and dividing its vessels into numerous branches, which radiate towards the circumference. In other animals, as the ruminants, the tufts are separated from each other and distributed to different parts of the whole chorion, so as to make a great number of placentas. In certain other genera, the tufts consist of zones, surrounding the oval ovum; or they are scattered everywhere like a paste over the entire superficies of the ovum.

Fig. 59.

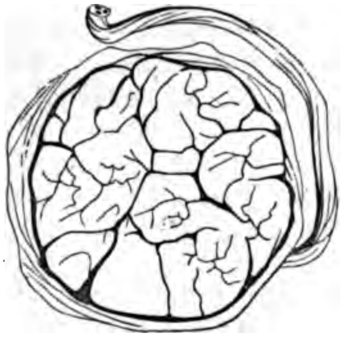
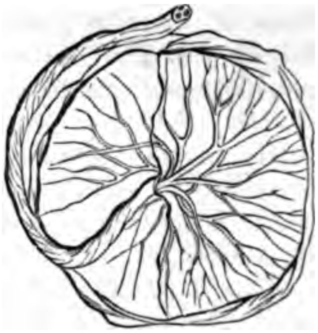


Fig. 60.



In the cetacea, the whole exterior aspect of the chorion is developed into one sole placenta, so that the superficies of placental or branchial contact is as vast as possible. I might subjoin a magnified view of a section of the uterus of a porpoise, Delphinus nesarnak, in order to show the Student what an enormous surface of contact has been provided for this genus.

Such a plan would show the solid substance of the womb, and a soft spongy mass that rises into deep folds everywhere from its inner surface, and which is evidently the analogue of the tubular membrane, described by Prof. Coste, as the decidua vera. This spongy material is unquestionably of the same nature as the cotyledonous mass to which the placentules of ruminants are attached. The outer face of the chorion, which is developed into the state of a fleshy and vascular excrescence or placenta, dips into all these reflections, so that, by such means, both the superficial contents of the inner paries of the womb and the outer paries of the chorion are multiplied many hundred fold. A most admirable plan is thus afforded for maintaining the supply of oxygen to the cetacean fœtus during the long suspension of respiration of the dam. Whales not unfrequently dive for half an hour; and they have been known to disappear an hour and a half, and yet come to the surface alive.

It is certain that blood does not follow the detachment of this vast placenta, and that no vascular tractus is broken by the severance of the utero-placental union.

The cetacean placenta is probably the largest to be found in any of the genera.

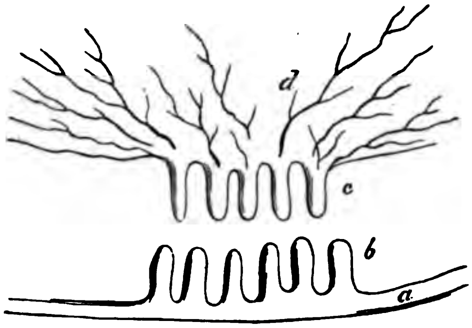
The pachyderms have a very extensive superficies of contact, and the ruminants are likewise amply provided.

I have counted one hundred and twenty placentas upon the chorion of the cow.

Now, it happens that, when, in a quadruped, these variously formed placentas are detached in the act of parturition, and expelled from the womb, no blood follows the detachment—nor do we ever hear of those uterine hemorrhages in the mammifers that so frequently, in the woman, render labors alarming and dangerous. Yet, the fœtus of the larger quadrupeds is evolved and completely nourished by an apparatus which, to be capable of supplying it with alible matter and oxygen, might be deemed to require at least as absolute a union and combination of the uterus and placenta as is contended for by Hunter and his advocates, as to the human organ. It is said that the fœtus of the whale is upwards of twenty feet in length at term. To develop so enormous a product, one might well suppose necessary a union as close as that in the human embryo, which is only eighteen inches long, and of the weight of seven pounds. It is not pretended, however, that the parturition of the mysticetus is hemorrhagic; nor that there is a deciduous coat of the womb that is converted into what Hunter calls a maternal

To develop an embryo is, therefore, a possible power, independent of vascular union or any maternal portion of the placenta. Those, therefore, who contend for the truth of the Hunterian explanation do so on the ground of a supposed fact, and not on one of a necessity. But, as the largest mammal fœtuses do not require it, it would appear to be reasonable, at least, not to adopt the theory in man, except upon anatomical conviction.

Fig. 61.



The placentules of the ruminants consist of very large villi which interlock with similar villi, or rather digitations that rise up from the cotyledons on the inner aspect of the womb. I add here, in Fig. 61, a view of them, in which the placentule, *d c*, is seen drawn out of the cotyledon, *a b*.

Let the Student procure from a butcher's shambles the gravid uterus of a sheep or cow, and carefully separate, one by one, the one hundred and twenty placentas from their one hundred and twenty uterine cotyledons, and let him judge whether or no there is, or ever could be any vascular union between them, and whether the womb furnishes any portion of the placental mass that is thrown off in parturition. If he repeats the same experiment as to the sow, the rat, the rabbit, the bitch, and the mare, he will be surprised afterwards to contemplate the drawings and representations, in the books, of the microscopic appearances discovered in the human placenta. The engravings, for example, in Breschet's work, will seem to represent rather the imagination of the artist than the truth of nature; and I may make the same remark as to Ritgen's beautiful picture in his *Beiträge*, and to Dr. William Hunter's nineteenth plate.

To possess a gravid womb at term, and to enjoy an opportunity to examine it leisurely, is to be what Noortwyck calls *rarissimum hocce spolium mactus*. Even in London, Professor Owen appears to have waited long before obtaining such a privilege; and Dr. William Hunter says, that "opportunities of depicting the human pregnant uterus at leisure, very rarely occur. Indeed, to most anatomists, if they have happened at all, it has been but once or twice in their whole lives." *Anat. ut. Hum. Grav.*

I have enjoyed but few such opportunities during a long course of business in a great city. Those I have had were as carefully improved as my means would admit; and as I must confide in my own, rather than in other men's senses, I find it impossible, under my own observations, to adopt the views of the Hunters, and I prefer the opinions of Seiler and of Velpeau. One ought not lightly to dissent from great authorities, nor is it without a sentiment of profound respect for the Hunters, that I claim the privilege to see with my own eyes, in a matter so authoritatively determined by those great benefactors of Medicine.

In what is called Deliverance, the *whole* placenta comes off from the womb. Kiwisch doubts that this is the case, supposing that a portion only of the maternal part comes off with the fœtal portion.

As a general rule, the placenta is separated from its position on the vault of the fundus, by the same pain that chases the buttock of the child into the vagina, and is completely extruded from the genital fissure in about ten minutes. Sometimes it is expelled within twenty minutes after the commencement of a labor.

I have removed a vast number of placentas without staining the hand with blood, or perceiving a drop upon the mass itself.

The placenta comes off with equal readiness at the third, fifth, or the ninth month, showing that no other action of the womb is required for its expulsion than that of its muscular tissue, and that all times and stages are indifferent as to the facility.

I find, in dissecting the gravid womb at full term, that the slightest traction suffices to remove the placenta from the surface where it had ever before enjoyed an undisturbed attachment; and that, too, very soon after death. I am convinced that the connection may be broken up even by puffs of air from the blowpipe; and that it is not more adherent than is the peel of a perfectly ripe orange to the fruit. Can it be that the womb may exfoliate its half of the placenta with such amazing facility, and that, too, in all the stages of pregnancy? Do these facts consist with the idea that arteries pass from the womb into the placenta? Are other arteries broken so easily? Has the womb its half?

I have already mentioned, at page 198, the case of a lady who died here in June, 1848. In the *post-mortem* examination in presence of Dr. Yardley and Dr. Wallace, I detached the whole of the placenta from the womb, after the careful injection of the aorta made by Dr. Wallace, an expert anatomist, who had secured the external iliacs before throwing the injection into the trunk. Neither I, nor those gentlemen, upon the most minute and careful search, aided by good lenses, could verify the existence of even a single vessel passing from the womb to the placenta. Much of the injection was effused into the cellular meshes of the placenta. It was an infiltration of the material, and not an injection, in the anatomical sense of the term. We arose from the dissection, equally and unanimously convinced that we had not seen a single vessel broken off, or pulled out, in the slow, gentle, and most careful divulsion of the two surfaces, uterine and placental. This examination was made within less than twenty-four hours after the demise of the lady.

During the epidemic of cholera here, in 1832, I examined a gravid womb at term within a very few hours after the death of the woman, in company with the late Dr. J. Hopkinson, then prosector at the University of Pennsylvania. He, though a practical anatomist, was unable, as I was, to detect anything broken, save mucous tractus, though the light and the glasses were good, and the most scrupulous care was used, without precipitation or rudeness in the operation.

A similar opportunity was enjoyed, a few years since, at the Pennsylvania Hospital, in a womb gravid with twins. Here, also, I detected nothing but mucous tractus. Another very fine specimen, at the seventh month, was afforded to me by Professor Pancoast at the Jefferson College. In this case, many medical students observed the divulsion of the surfaces without detecting any vessels. I have had other similar opportunities, and the same results.

These are the opinions I adopt; but when so many explanations abound, who is he that can feel perfectly assured of the soundness of his own? There is one argument against these opinions which I conceive it a duty to state; for that which I desire is, the truth. The argument may be presented as follows:—

It is admitted that blood-vessels, whether arteries or veins, or capillaries, when deeply inserted within the tissue of an organ or viscus, always leave their additional coats and go within the intimate tissue solely as *membrana vasorum communis.* Professor Burdach calls this lining membrane ENDANGIUM, a word more easily pronounced than the common Latin term, or the long English compound word lining-membrane of blood-vessels. I greatly prefer, therefore, to employ the word *Endangium*, after the illustrious German teacher. Raciborski, in his elegant treatise on the veins, published in the *Transactions of the Royal Academy of Sciences*, clearly shows that the true blood-vessel is in fact this very membrane, and that the other textures found in larger arteries and veins are merely the protectors of the real vessel in its transit from the heart to the distal point in which its essential offices are to be performed. On various occasions I have been struck with this appearance in the large sinuses of the womb, some of which are so capacious as to admit the introduction of a finger into them. Here, the lining membrane, *Endangium* or true vessel, seems to sit upon the very substance of the womb, which serves as its basement tissue without intervention of any fibrous coat or other whatever; which, according to Raciborski, are left outside as the vessel enters into an organ.

It is certain that living blood in motion, makes its own channel. This is the case in the first forward movement of the corpuscles in the incubated egg; and it is certain that the track thus marked out is at an early date bounded by a membrane which is *Endangium*, and that in the ulterior development of the vascular tubes the stronger coats are superadded, until at last even the strongest and most elastic portions of the aorta itself become completed. But these strong elastic coats cannot be considered as the real blood-vessel, since they are, in fact, only its muniments and protectors against over-distension or laceration.

Now, it appears to me reasonable to say that, if this true blood-vessel terminates and opens up on the surface of the womb, as it surely does, and rests either obliquely or perpendicularly upon the softish mass of the nascent placenta, which serves as an obturator to its orifice—one might expect the impulse of the blood should make an impression upon that soft substance, and, passing a short distance within it, come at last to clothe itself with a membrana communis or *Endangium*, and that, along this endangium or tube, the matter of injection might pass, giving rise to the appearance of what Dr. Hunter calls the spiral vessels. But these spiral vessels cannot carry on any true circulation, since they do not divide into capillaries, and so, returning as venules, allow their blood to re-enter the circulation.

The same thing happens as to coagula formed in the heart, or elsewhere, when they are observed to have become injected by the circulation, and thus endowed, as it were, with a sort of organization.

I cannot conceive that blood once poured out into placental cells can ever again go back into the course of the circulation, because it is undeniable that blood, when once escaped from the contact of the *Endangium*, dies or becomes coagulated, which is indeed the same thing as its death. To say that the blood is extravasated into the placental cells, is to say that it is extravasated or dead. There can be, therefore, no such physiological condition; so that I cannot and will not receive such a dogma, from any authority—no, not even the highest.

Blastoderm.—The child continues in the womb during nine months, or two hundred and eighty days, according to the common computation or reckoning. This is the length of time required for the evolution of all its parts, which may be supposed to have existed *in potentiâ* in the ovarian germ.

At the commencement it was a mere membrane or blastoderm, so called from βλαστος a germ, and δεςμα skin. It is commonly called germinal membrane. This, in the hen's egg, is found in the cicatricula or tread, and is supposed to be divisible into three layers or strata, of which the inferior, or that which looks inward towards the centre of the yolk, is the mucous layer, the outer one the serous layer, and the middle or interposed one the vascular layer. The mucous layer is deemed to be the basis of the digestive tube, the serous layer is held to give origin to the skin and muscles, &c., and the vascular layer is devoted to the development of the heart and circulatory apparatus, the muscles, &c. &c.

Such is the doctrine inculcated by some of the writers on Embryogeny.

We have seen that the mammal ovum is microscopic, and that the vitellary ball is thrust forth from the ovi-capsule, seized upon by the Fallopian tube, and, as is supposed, deposited in the course of about eight days, within the cavity of the womb. By the time it reaches the womb, it has acquired considerable additional volume, and very shortly afterwards is found to be a visible and palpable mass, already covered with its villi of the chorion, as in Velpeau's Figure 1, representing an ovum of eight or twelve days, in his first plate.

Microscopy has not hitherto revealed a double coated capsule of the vitellary granules and corpuscles, but certainly only a few days elapse after the fecundation, before we may discover that the vitellary membrane, now become chorion, contains within it another vesicle or membrane called the amnion, in which is enclosed the embryo, with the waters and the cord. When I was at Louvain, in June, 1845, Dr. Thos. Schwann kindly showed me a most beautiful early embryon, in which the amnion was scarcely yet completely developed. I refer to *Wagner's Physiology* for explanations of the supposed processes by which it is formed and encloses the embryon; I have no space here for that purpose.

The heart of the embryo is early developed, first as a straight pulsating cylinder or artery which is afterwards bent, and finally converted by its morphological laws into the complex organ of the warm-blooded circulation. This heart drives the blood into the embryonal sarcode, wherein the blood makes its own channels, which, as they become complete, are blood-vessels. As the blood advances, the substance of it is converted histologically, and it becomes tissue, for "the blood is the fluid body, and the body the fixed and rigid blood," to reiterate the fine saying of Oken. Thus the blood creates the organs, but it does so under the dominant, controlling, indicating power of the nervous mass, in which reside all the powers of a living being. A nerve plexus waits upon every blood-vessel.

Allantois.—Among other organs is created an allantois. This is a small vesicle or bladder which rises from the pelvic extremity of the embryo, and springing forwards from the still open belly, proceeds to place itself betwixt the outer chorion and the inner amnion, enlarging itself and at length attaching itself to the chorion, carrying with it the blood-vessels which create it, and which are umbilical arteries which it applies by their distal extremities to the inner aspect of the chorion. This chorion they pierce, and go through to seek an attachment, as placental tufts, on the inner wall of the womb. This bladder is the allantois. When the belly of the embryo becomes closed in, this bladder becomes strictured at the navel, and in the tractus of the umbilical cord. The narrow strictured part of the vesicle is now a long cylindrical tube. The part retained within the now closed abdomen is the bladder of urine; the long cylindrical part is the urachus, and the outer expanded, or, to speak correctly, uncompressed and unstrictured portion is the allantois. The urine secreted in the kidney passes by ureters into the bladder of urine, and in the early stages of uterine life flows through the urachus into the bag of the allantois. Thus the allantois may be said to be a bladder or vesicle, upon which the umbilical arteries climb towards the wall of the womb to attach themselves there. The word allantois should, according to Kraus, in his *Lexicon*, be allantodes. Its Latin equivalent is *farcimen*, of which the English translation is sausage or gut-pudding. The earliest description of it was given by Galen, who evidently took it from the investigation of the ovum of the ruminants, in whose horned womb the allantois is a remarkable and most obvious organ which lines the interior of the whole chorion, and passes through or pierces its two ends to go to fill up the cornua as far as possible. No more correct description can be found of it than in M. Flourens's *Cours sur la Génération*.

By many its existence in the human ovum is wholly denied; yet it is asserted that in very early stages of fœtal existence, injections into the urinary bladder of the embryo can pass along a urachus in the cord and go to be effused betwixt the amnion and the chorion: certainly it is by no means demonstrable in any advanced state of human pregnancy, as the Student will experience whenever he shall have an opportunity to dissect the aborted ovum, or inquire into the appearances of the secundines thrown off in an easy natural labor. The allantois, where it lies betwixt the chorion and amnion, probably becomes early compressed or collapsed, so as to disappear wholly.

Umbilical Vesicle.—The human yelk, as I said, is a microscopic globule filled with vitellary corpuscles. When the blastoderm has partly undergone the morphological changes that convert it into the earliest rudimental embryon, part of the yelk corpuscles still remain unappropriated; and, as they are still contained in their original vitelline membrane, they constitute a small but visible ball called the umbilical vesicle. Originally, the vitellus was a sphere, as in the Figure 62 annexed.

Fig. 62.

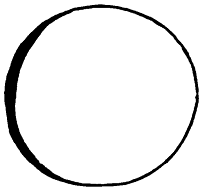
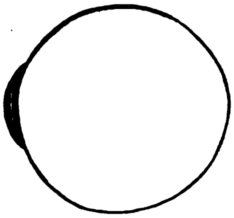


Fig. 63.



The blastoderm is developed upon a segment of this sphere, as in Fig. 63.

Fig. 64.

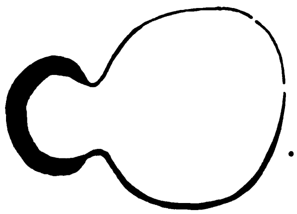
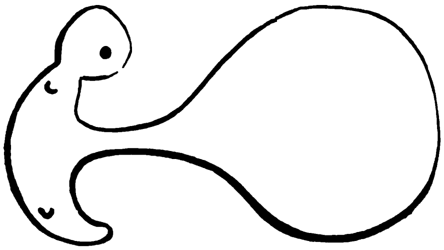


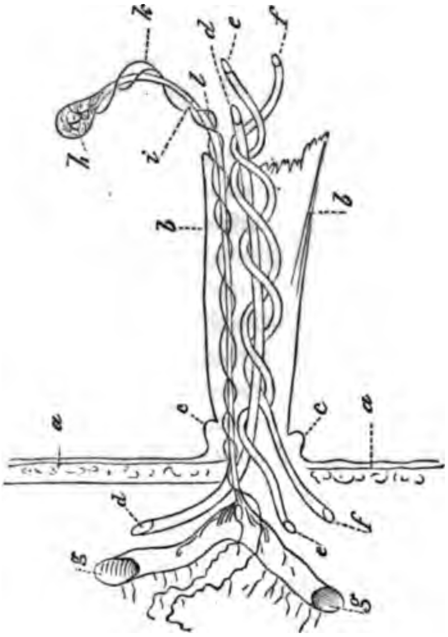
Fig. 65.



When the blastoderm doubles or folds its edges inwards, it pinches a portion of the vitellary ball, as in Fig. 64.

In a still farther progress, Fig. 65, the portion of the vitellary ball that remains outside of the embryon is connected to the embryo by a delicate tube or vitellary duct. This tube or duct opens into the intestinum ileum of the embryo. Velpeau says that the yelk matter contained in the umbilical vesicle can be pressed along the tube and through it squeezed into the gut. It is supposed to furnish a pabulum to the early embryo, but is lost after the fourth month; for, by that time, the amnion has grown so considerably as to fill up completely the cavity of the chorion; wherefore the umbilical vesicle being squeezed flat betwixt the amnion and chorion, finally disappears, becoming of no functional value when the child has completely established its branchio-absorptive connection with the parent—just as happens to the urachus and allantois.

Fig. 66.



Omphalo-Mesenteric Vessels and Cord.—In perfect ova, aborted at the period of two months, or a little later, the Student will readily distinguish the umbilical vesicle shining through the chorion and lying betwixt it and the delicate amniotic membrane. I add here a figure, that may serve to explain its arrangement. Let *a* be a portion of the abdomen of the embryo, and *c c* the navel or umbilical ring; *b b* the navel string or cord laid open; *d* the umbilical vein bringing back the blood from the placenta, and passing into the belly at the ring to go to the liver; *e f* the two umbilical arteries of the fœtus; *h* the umbilical vesicle or vitelline sac, whose pipe, conduit, or efferent duct runs along the umbilical cord to the navel, and passing into the belly empties itself in the ileum *g g*, which bends up to receive the discharge; *k l* represents the omphalo-mesenteric vessels.

In very early states, the knuckle of intestine rises quite high up in the root of the umbilical cord—occasionally it becomes fixed there, and the child, continuing to grow, is at length born with an irreducible exomphalos. A careless accoucheur may, in cutting the navel string, have the misfortune to cut off the top of the arc of intestine, and thus subject the miserable neonatus to the disgusting possession of an artificial anus, as happened in a case within my knowledge. I have seen the major part of the convolutions of the small intestines detained in an immense exomphalic tumor, covered only by the cord and a lining of peritoneum to which they irreducibly adhered. As the cord is essentially deciduous, no hope is left to save a child thus deformed. It is non-viable.

Now, as the umbilical cord is lined externally with amnion, it is clear that the umbilical vesicle lies outside of the amnion and inside of the chorion within a space which, perhaps, might be properly called the allantoidal space. There is no doubt of the normal existence of this allantois or allantodes for the birds and the mammiferous quadrupeds; but as to man it is much questioned, and, as I have said above, it cannot be demonstrated that there is a sac that may be dissected out, existing betwixt the amnion and chorion. Noortwyck's fine dissertation upon it towards the end of his volume, "*Uteri Humani Gravidi Anatome et Historia*," 4to. 1743, appears to me to settle the question: in his criticism on Walter Needham's views of the sac, Noortwyck shows that it is indifferent whether there be a sac or no, for the space between the chorion and amnion is to all intents and purposes a true and sufficient allantois, one in which the urine of the early fœtus can be discharged, as it is well known to be in the allantois of the bird, in which urinous concretions may be found.

After all, the Student may rest satisfied upon the point in so far as to understand that an allantois is a urinary bladder constricted in the middle like an hour-glass, the narrow neck being the urachus, the interior sac being the ordinary bladder of urine, and the one lying betwixt the chorion and amnion the real allantois.

The embryo has now established its connection with the parent; it has surrounded itself with its amniotic membrane, which fills with the liquor amnii in which the new being is suspended.

As its umbilical cord comes out of the abdomen nearest the pelvic extremity of the embryo, it hangs suspended with its head downwards whenever the woman is in a sitting or standing posture. It is true that the cord lengthens daily, and sometimes attains the length of six feet, although inclosed in a womb never more than twelve inches long. With such a great length, or even with a cord of eighteen inches long, it can no longer be said to be suspended; still, the cephalic extremity of it falls to the lowest place, and the fœtus as well as the embryo directs its head to the os uteri—it presents its head to the os uteri during the utero-gestation as well as in labor.

Circulation of the Fœtus.—The circulation of the fœtus is peculiar to it, and its continuance in the same way after birth is inconsistent with respiratory life. If, therefore, the fœtal circulation does not give place to the respiratory circulation, the neonatus perishes. This often happens. It is equally true, on the other hand, that, if the fœtal characteristics as to the circulation are lost before its birth, it must of necessity be born dead.

Let us inquire into the nature of the fœtal circulation.

The heart of the child in utero has four cavities—viz., a right and a left auricle, and a right and a left ventricle.

An opening in the septum auricularum, which is called the foramen ovale or Botalli's foramen, and which, on the left side of the septum, is covered by a light floating valve, the valve of the foramen of Botalli, virtually converts these two chambers into one, as two apartments are thrown in one by opening a wide door between them.

The left ventricle gives origin to the aorta. The right ventricle gives origin to the pulmonary artery. But, to speak rigorously, the pulmonary artery does not exist in the very beginning; for that which is called pulmonary artery is, in truth, the ductus arteriosus, from which the pulmonary artery arises at a more advanced period of gestation. Seeing that this is the case, and inasmuch as the ductus arteriosus joins the aorta below the arch, it is apparent that, when the right and left ventricles contract simultaneously, they concur by their united power to drive the blood along the tube of the aorta—and this combination of the force of both the ventricles is, perhaps, requisite to propel, not only the blood that circulates within the limits of the child's body, but also that which it sends far beyond those limits to take up plasma and oxygen in the placental tufts, at the distance, sometimes, of six feet, and generally not less than twenty-four inches from the systolic source. Thus it is seen that the fœtal heart, though divided like that of the breathing warm-blooded mammal, into four distinct chambers, is, by means of the foramen of Botalli and the ductus arteriosus, reduced back, in fact, to the condition of the fish's heart, which has but two cavities, one auricle and one ventricle, while the placenta, which is its branchial organ of aëration, takes up, like the gills or branchia of the fish, the oxygen it finds in the medium wherein it exists. Thus the heart employs the strength of both its ventricles to carry on such an exaggerated circulation.

There can nowhere be discovered a more admirable adaptation of a simple machinery to produce compound results, than in that of the fœtal circulation; for, by the arrangement above mentioned, the single tube of the aorta is capable of effecting the double purpose of conducting the aërated blood to the tissues, to oxygenate them; and of carrying back the carbonated blood to the placenta. The aorta, in this sense, is at once an oxygeniferous and a carboniferous tube. For, be it understood, the blood, when endowed with oxygen in the placenta, returns along the umbilical vein to the navel, whence, running at the edge of the falciform ligament of the liver, it enters the great fissure, and divides; part of the fluid entering into the left hepatic porta, the rest continuing its course through the ductus venosus, delivers it into the left hepatic vein, which pours it into the lower cava. From the cava it enters the lower, right, posterior part of the right auricle, behind the curtain-like valve of Eustachi, which conducts it across the posterior part of the auricle to the foramen of Botalli. Here, the current lifts the valve on the left side of the septum auricularum to fill the left auricle. The auricle, being full, contracts, and pushes it into the left ventricle, whose next contraction injects it into the aorta. Thus the oxygenated blood of the placenta reaches the aorta. Much of it is now determined to the brain and the superior extremities; the rest, turning through the aortic arch, is distributed in all the branches of that great trunk, a portion going back to the placenta again in common with the carbonated blood of the fœtus.

This is the systemic circulation of the fœtus.

But that portion of the placental blood which passes into the carotids and subclavians, gives up, in their capillaries, its oxygen and part of its substance to the brain and upper limbs. It is next found in the veins, and returns to the right auricle by the route of the superior cava, which delivers it into the top of the auricle in front of Eustachi's valve, and opposite to the *iter ad ventriculum dextrum,* which gapes to receive and ingurgitate it. As soon as the right ventricle becomes filled, its contraction follows, and this black blood, or venous blood, or carboniferous blood is injected into the ductus arteriosus, which pours it into the aorta below the giving off of the left subclavian, thus precluding the possibility of its return to the brain, where its carboniferous nature would make it fatal, by the superinduction of asphyxia; because, asphyxia is black blood in the brain. The venous blood that has thus returned from the encephalon and arms is, by this beautiful arrangement, carried with due precision back to the lower parts of the child's body, mixed with the aërated blood, and a portion of the carbonated blood of the trunk and lower extremities. The umbilical arteries receive their share of the mixed blood, and deliver it to the placental tufts, whence it returns through the same round or circulation as before. By this curious arrangement of the cavities and opercula of the heart, there is a crossing of the currents of red and black blood in the right auricle, the red blood running horizontally across the posterior part of the auricle, and the black blood falling perpendicularly downwards from the aperture of the superior cava, in front, into the iter ad ventriculum dextrum. Doubtless, the valve of Eustachi contributes much to the perfect operation of this mechanism, while Botalli's valve ensures it.

The branchial apparatus above described suffices in all the mammals and birds to communicate to the constitution of the embryo the requisite amount of oxygen; but it ought to be observed that that amount is small, indeed, compared with the freeness of the endowment vouchsafed in a state of respiratory existence. The embryo requires no more than what suffices to oxygenate its fluids and solids to the extent of provoking an active nutrition and imparting a power of gentle and rare muscular motion—for the fœtus in utero may be regarded as torpid, and approaching in torpidity to the state of a hybernating animal. To cut off even this slender supply is to ensure its destruction. Now, inasmuch as the placental blood, entering in at the umbilicus, passing by the ductus venosus to the inferior cava, along that tube to the auricle, and through the foramen Botalli to the left auricle, left ventricle, aorta, carotids, and vertebrals to the brain, takes the only possible route from the placenta to the brain; it is clear that, if, before the birth, the foramen ovale should be closed, no oxygen could possibly reach the brain. But oxygen in the brain is essential to the evolution of biotic force. When, therefore, no oxygen reaches the brain, the brain evolves no nerve force, and the patient dies asphyxiated. The law, then, is that the fœtus is born with an open foramen ovale, which becomes closed after birth, generally within three or four days, often in ten or twelve days, not rarely about the twentieth day, and sometimes never.

I have said that the child's foramen Botalli remains open during the whole uterine life; but the Student ought to observe that it is always covered by its valve, lying upon the left side of the septum—a valve so light and delicate as to be transparent, and so beautifully arranged as to enable it to cover the aperture in the most perfect manner. The weight of a drop of blood, resting on its right side, might lift, as a drop on its left surface might shut it down. The normal direction of the current through the foramen keeps it open in the fœtal heart. When, therefore, after the child is born, the two auricles act at the same time in equal times, and with the same intensity, the valve is pressed upon the opening to cut off the fœtal route, and compel the whole of the right auricular torrent to pass into the right ventricle. The first act of the diaphragm by expanding the fœtal lungs opens a way by which the blood of the pulmonary ventricle may flow off through the pulmonic vessels, which they could not perfectly do before. If the left auricle should after the child is born be the strongest, the earliest, and the longest to contract, it is impossible that any black blood should come into it. If, on the other hand, the right auricle should, after the birth, contract sooner, longer, and more energetically than the left, the valve of Botalli would be lifted, and the black blood of the venous system, instead of flowing off by the pulmonary ventricle and artery to the lungs, would in part pass to the left auricle, ventricle, and aorta to inundate the neurine of the brain with its carboniferous stream, which, wholly incapable of exciting any biotic force in the brain, would end in cyanosis—asphyxia—death. When the nervous mass ceases to act, the whole constitution is dead. It always ceases to act where there is no oxygen. Where the oxygen reaches it in quantity insufficient to extricate the just amount of neurosity, the functions fail of their just force and regularity.

The Student will now understand that when the child is born at full term, its peculiarities, as to the structure of the heart, remain for some time unchanged; and he will be able to appreciate certain conditions of the *neonatus* dependent upon the continuance, partially, of the fœtal circulation—a circulation, in which the aëration of the blood is of so low a grade that it cannot supply the demand for the more vehement energies of the respiratory life.

Children are sometimes born dead without any known cause. It is probable that, in some of the instances, death has taken place in consequence of the too rapid progress of the development of the heart, which, hastening to reduce its fœtal openings to the smallest diameter consistent with intra-uterine life, urges the reduction of the apertures beyond the legitimate bounds, and thus renders death inevitable by cutting off a part of the already scanty supply of oxygen to the neurine of the brain.

If, in its gyrations within the womb, the child should enter a coil of the navel-string, and, passing through it, should thus make a knot on the cord—that knot, happening to be strongly drawn, might cause its death by hindering the complete return of the blood of the placenta. Sometimes two, or even three such knots are found on the cord. I delivered a lady here of a very fine child which was dead-born, apparently from the closeness with which a navel-string knot was thus tied. It is true, however, that we meet with very healthy and vigorous children, notwithstanding the presence of one, or more than one of these knots on the cord, which, however, have not been tightened.

Since pressure on the cord, and obstruction of the course of the blood

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in it, may cut off the fœtus in utero, it is evident that, where the cord prolapses in a labor, it may be fatally pinched betwixt the bony head of the infant and the osseous wall of the pelvis—nay, the resistance of the os uteri, vagina, and orificium vaginæ, may suffice fatally to compress it. Of this, however, we shall speak in another page.

The child in utero is liable to a great variety of diseases, and to accidental monstrosities of structure that exert a very unhappy influence upon the labor. Thus it happens that the encephalon sometimes becomes the seat of a dropsical effusion, a deformity which renders the size of the head so vast as to make its transit through the pelvis impossible, until, by an embryulcia, the hydrencephalic fluid shall have been discharged.

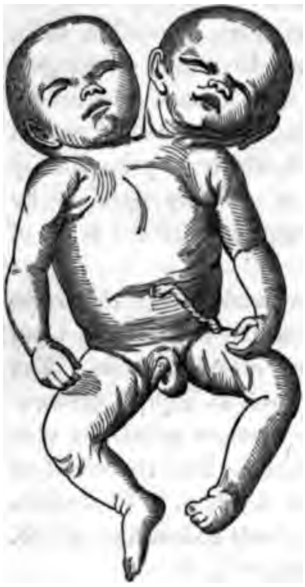
In like manner, vast collections of water in the abdomen constituting ascites of the fœtus may render the belly so large that the child cannot be born until it shall first have been tapped, which may be readily done with the long trocar, described by me in a future page, or by means of Holme's perforator, in cases where the signs of the death of the fœtus are absolutely unmistakable.

It is proper that the Student should be here made aware that some of these great watery swellings of the belly of the fœtus have, upon examination, been discovered to be cases of retentio urinæ. The urinary bladder of the child has been known to rise as high as the scrobiculus cordis, and distend the belly like an enormous ascites, in consequence of obstruction or atresia of the urethra. The treatment of such a case, of which the diagnosis, before its delivery, is impossible, is the same as for ascites—*videlicet*, the paracentesis abdominis—which, reducing the swelling, allows the birth to be effected.

In addition to the cases of disproportion effected by dropsical collections, there are instances of accidental disproportion resulting from the union of two fœtuses in one. The celebrated example of the Siamese twins is familiar in the United States, and it is easy to conceive that such a union could not but render difficult and preternatural a labor in which such twins should be born.

The instances of children with two heads are not rare, numerous examples of them being contained in the books. The example that has been so admirably described by M. Serres, in his *Anatomie Transcendente*, appears to me to be particularly worthy the Student's attention. This monster was born at Sassari, in the kingdom of Sardinia, in the year 1829. There were two heads, a double thorax, with four arms, and one abdomen with two legs. Being christened, the one on the right took the name of Rita, and the left one that of Christina. Rita-Christina was brought to Paris and exhibited there, until death closed the exhibition when the monster had attained the age of eighteen months. I subjoin a figure which represents a case of double-headed fœtus, born in Adam's County, Penna., in 1844, under the medical care of Dr. Pfeiffer, a German physician in practice there, who brought the monster to this city. I engaged Mr. Neagle, one of our best artists, to paint a portrait of it, from which this small cut is taken, and represents it very correctly.

Fig. 67.



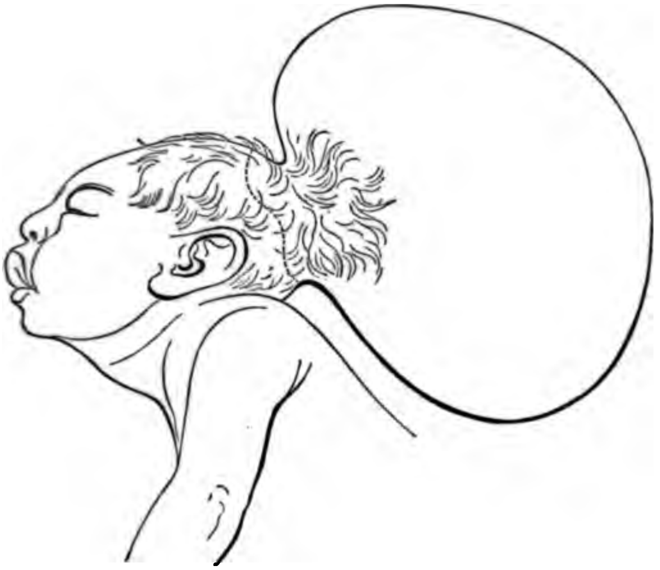
In this figure it is seen that the monster possessed only a right and a left arm, whereas Rita-Christina had four arms, because in her case, the cervical, dorsal, and lumbar vertebræ were complete for each child; whereas in this sample, the cervical and dorsal vertebræ only of each child were complete, while they united in a common or single lumbar spine, and one pelvis. Rita and Christina each had its own ribs, and a sternum for each, yet admitting of a single thoracic cavity for two hearts, and only two lungs. The liver was a compound of two livers; there were two stomachs, two duodenums, two jejunums, and two ilea, uniting, towards their lower extremities, into a single short ileum, inserted into a single cæcum. There was but one colon and one rectum, and one bladder of urine.

The *Comptes Rendus* of the French Academy of Sciences for Sept. 4th, 1848, contains a description, by M. Valenciennes, of a porpoise with two heads, but having, like the child in Fig. 67, only two arms.

There is, in my collection, a specimen, consisting of two children united by the ileum intestine, which comes out from the navel of each child covered by the umbilical cord. The two cords, midway betwixt the children, merge into a single umbilical cord, inserted into one placenta. This specimen was presented to me by Dr. Clarke, of Philadelphia County. The children are separated by the omphalodymic cord about four inches; and there are two apertures in the cord, each of which is an accidental anus, from which the meconium escaped freely. There are also two apertures from which flows the urine produced by both children. There are many cases to be met with, of children with only one head, yet possessing two bodies and four legs; and some, in which the heads are united at the summit, or crown.

Here is a correct portrait of a fœtus that was shown to me by Dr. Rohrer, of this city, soon after its birth under his professional care.

Fig. 68.



The great tumor on the vertex consisted of scalp lined with the ordinary encephalic meninges, and filled with the water of a vast dropsy of the brain. The posterior part of the parietal and occipital bones was wanting; some hairs grew on the part of the tumor near the vertex; the rest was bald. The child was in other respects well formed, and very large. The tumor was soft and fluctuating, but not reducible in size by pressure in the hands. Its greatest length was nine inches. I shall refer hereafter to this figure, to that of the double-headed monster of Dr. Pfeiffer, and to Rita-Christina, to show the necessity and nature of what is in Midwifery called Evolution of the fœtus in all such cases. Observations on the midwifery of the case would be out of place on this page.

M. Serres's work, and that of M. G. de St. Hilaire, exhibit a great variety of Teratological fœtuses, to which I must merely allude, as the limits of this volume will admit of no extended observations upon them.

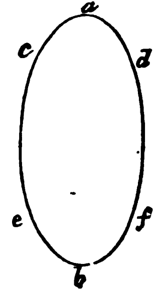
I have mentioned them here, chiefly with the view to put the Student on his guard, as to the midwifery of such cases, and still more in order that he may early learn that these monsters are merely results, not of excess, but of failure in development. The double-headed fœtus, Fig. 67, has two stomachs, and probably two hearts, but only one intestinal canal, composed by the union of the two jejunums, or the two ileums, into a single jejunum or ileum, a colon and rectum. This child is a twin, which has not acquired a superfluous head, but which has lost, one a left, and the other a right arm; one the right, and the other the left half of its thorax—one kidney—half the colon and rectum, bladder, testes and penis, and a right or a left leg.

This double-headed fœtus then has lost, not gained: it has been fused, or, to use a term in mechanics, welded. The right child has sunk part of its body in that of the left child, which in like manner has sunk the right half of its body in the left half of its twin brother. In Rita-Christina, if both children happened to be asleep, and one should tickle Rita's foot, she would wake and smile: so, if Christina's foot were tickled, it would cause her to laugh, without at all affecting her sister, for the left leg was Christina's and not Rita's, and *vice versâ*.

Happily, when twins are conceived, they inhabit each its own amnion, and in some instances, its own chorion; which insulates them. When the development of the amnion fails, and the two germinal membranes are suffered to come into contact within the womb, they may unite, or weld together, under a certain law; but the back of one cannot unite to the abdomen of the other, nor the head of one child to the other's pelvis. In order to unite, only the edges of the still unclosed germinal membrane can weld—that is, the left edge of one with the right edge of the other, and *mutatis mutandis*. Hence the law of development is binding; that law ordains that the right edge of the membrane, when bent over to shut in the trunk, should unite with the left edge turned inwards in like manner. Hence, it may fuse with the left or the right edge of its twin fœtus.

If we might suppose the germinal area of the germinal membrane to be in shape a long oval, like Fig. 69, and *a* the cephalic pole, *b* the pelvic pole; *c d* the brachial, and *e f* the crural regions; we may conceive that no sublunary power could develop a pelvis at *a*, or a head at *b*; a leg at *c d*, or an arm at *e f*; for even in this microscopic mass the generic law is as imperative and coercive as the attraction of gravitation is for the whole universe. There is nothing generically in common or identical in *a* and *b*, or in *c d* and *e f*; *c* unites with *d* only, and *e* with *f* only; when the scaphoidal germinal membrane has become completely bent into the apposition of the

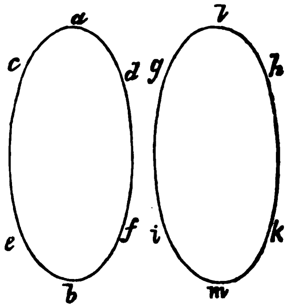
Fig. 69.



edges *c e* and *d f* to make the cavity of the belly and thorax, *d* could not unite with *e* nor *c* with *f*.

If in the adjoined diagram, Fig. 70, the two ovals may represent the germinal area of twins, then *a* and *l* may unite if brought into apposition, or *b* and *m*; *c* and *g*, and *e* and *i*, have no affinity. If *d* and *g*, which have affinity, should unite, the result would be a fœtus with one head, two arms, and four legs; if *f* and *i* be placed in contact in utero, their affinity would cost a left leg for the right hand membrane, and a right leg for that on the left. Thus we should have a Rita-Christina. It is a curious subject of reflection, that of the individuality or duality of a creature with one head and two bodies, or with two heads and one body. Rita-Christina was dual, as was Dr. Pfeiffer's monster, Fig. 67, but as to the monster figured in Serres's Plate 12, it is to be doubted whether the personal identity was absolute for each of the children—as there was one common cerebellum.

Fig. 70.



Doubtless it is not possible, in Teratology, to suppose that half of one child should sink into and be totally lost in half of another child, thus making out of two independent personal identities a single one. In nature, the union must take place from the liver upwards only, or from the liver downwards only; whence, it cannot happen that the whole right symmetrical half of the left twin should be sunk in the left symmetrical half of the right twin. We may therefore expect to meet with cephalodym or hepatodym or pelvidym, and not with such a union of two personal identities as would serve to personify the ancient fable of Salmacis and her lover.

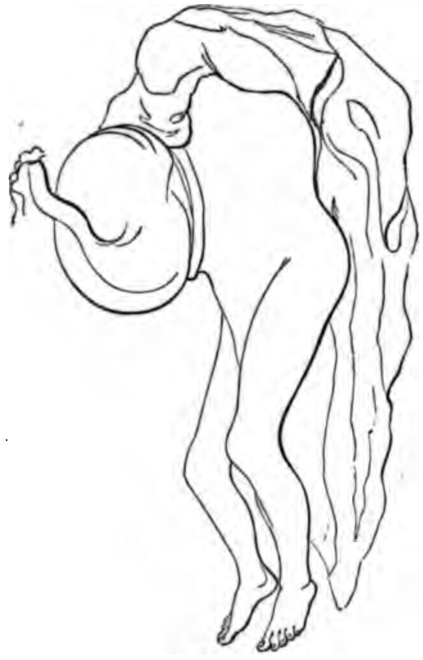
All such fusions imply loss, not gain of substance; or monstrosity by default, and not monstrosity by excess. If a child is born with six fingers on either or each hand, or six toes on either or each foot, it presents a case of excess of development, or monstrosity by excess; and the samples of five-legged calves, &c., that are commonly met with, are, perhaps, cases of monstrosity by excess.

There was a singular example of cephalodym here some four years ago: it was a healthy pig with one head, two fore legs, and two bodies, with four hind legs. It was a remarkable fact that the genitalia of this creature were not under a common influence of its encephalic nervous system; when the animal was in heat, it was either as to the genitalia of the right or those of the left trunk; but they were not observed to be in heat or rut at the same time, one trunk appearing to become the subject of the periodical excitement about ten days after the other had ceased to be so. What was the real condition of the identity of this monster!

The instances of monstrosity by default of development are sufficiently numerous; as, for example, in the cases of spina bifida, of anencephalous and acephalous fœtuses, and of fœtuses with imperfect limbs; and those with imperforation of the rectum, and with other atresias.

The Student will have little trouble to understand and explain these strange freaks of nature, if, in all cases, he will remember that the monstrosity is dependent either upon fusion of the parts of two different children, or on cessation, during the embryonal stage of life, of that growth and progress which, but for the arrestation, would have finished and rendered complete, parts that now exhibit the appearance of the most shocking deformity.

Fig. 71.



We meet with numerous cases of ectopy; cases in which organs or parts are displaced or deviated. Here, in Fig. 71, is the figure of a child lately born under my care. It lived for several days. The tumor on its belly is an exomphalos, consisting of the entire liver of the infant, which was contained within the root of the umbilical cord. There was no covering of this liver save the deciduous matter of the cord. Of course when the cord should fall after five or ten days, the liver would be wholly exposed. Such an accident renders the child absolutely non-viable. I possess another specimen, in which every abdominal viscus is outside of the belly inclosed within the umbilical cord.

Duration of Pregnancy.—The duration of gestation is ordinarily computed to be nine months or 280 days; and the Women, who understand these questions by a traditionary learning, commonly make their calculations with sufficient accuracy.

According to the Civil Code in France, a pregnancy may properly be held to continue until the 300th day; which is allowing a latitude of twenty days beyond term. I have been surprised to find how prevalent has been in all ages the opinion that a great latitude exists as to the duration of pregnancy, and that some of the ablest men of our profession, both ancient, mediæval, and modern, have admitted a latitude far greater than that allowed in the French Code. I rejoice that this is the case, because, having myself had reason to believe that pregnancy may endure even beyond twelve months, as I shall relate in another page, I conceive it desirable that the truth should be established for the conservation of the credit and peace of individuals or families, in cases where such extraordinary postponement of the term might give rise to the greatest injustice, as well as unhappiness. A great controversy arose in Europe in 1764, which was carried on by various writers until 1770, and brought out the opinions of the most celebrated medical men of the time; a collection of pieces on this subject, in three volumes, is in my library. The dispute arose on the question of legitimacy of a child, whose father, Charles, born January 15th, 1689, was more than 72 years old when he married Renée, Marchioness of Ingreville, who was at the time 30 years of age. He lived four years with his wife, and had no children. On the night of 7th–8th of Oct., 1762, he fell sick with fever, and violent oppression, which continued until his death. During his illness, his wife Renée did not sleep in his apartment. He died with gangrene of the leg, on the 17th of Nov., æt. 76 years. More than three months after his death, Renée gave signs of being pregnant. She was observed and carefully assisted by order of the collateral heirs, and gave birth to a son, Oct. 3d, 1763. From Oct. 8th, 1762, to Oct. 3d, 1763, is one year, lacking five days. The question was submitted to various leading medical persons for their opinions as to the legitimacy of the child, and the three volumes exhibit the most striking examples of the disagreement charged among doctors, many strongly denying the possibility of Renée's purity, and others as earnestly vindicating the legitimacy of her son.

It would seem that the most common and ordinary observations and proofs are incapable of expelling from the public mind opinions long established, upon whatever foundation. There is hardly to be found an old wife in the country, who does not know that the term of incubation of the barn-door fowl is uncertain; and that, though it ordinarily lasts twenty-one days, the chick may be found to escape from its shell on the twentieth, or to linger in it, sometimes, to the twenty-second or twenty-third day. Similar facts as regards the gestation of our domestic quadrupeds are abundant, and sufficient to demonstrate the latitudinarian character of what is called term. To show the differences in gestation, I subjoin the following tables which I find in M. Rainard, *Traité complet de la Parturition des principales Fémelles Domestiques*, tom. i. p. 233, *et seq.*

The date of the Covering was noted as to fifteen mares, of which eight foaled after 340 days, three after 342 days, three after 343 days, and only one at 346 days.

Brugnone, in like manner, in fifty-five mares found that the foaling took place in

1 in 10 months less 7 days
1 " 11 " " 1 day
2 " 330 days
2 " 333 "
2 " 334 "
2 " 335 "
3 " 342 "
5 " 343 "
2 " 344 "
3 " 345 "
4 " 346 "
4 " 347 "
1 " 348 "

4 in 336 days
2 " 337 "
2 " 338 "
1 " 339 "
3 " 340 "
1 " 341 "
2 " 351 "
2 " 352 "
1 " 353 "
1 " 356 "
1 " 357 "
1 " 369 "
1 " 389 " or 13 months.

"The difference between the most precocious and the most protracted gestation amounts here to seventy-seven days, or two months and a half. From his table, Brugnone concludes that the gestation is not complete in less than one year, and that, when it goes beyond that term, there is no fixed period."—P. 233.

M. Tessier found that in the gestation of 200 mares, there was a latitude of eighty-three days.—P. 239.

The *Journal d'Economie rurale Belge*, 1829, finds a minimum of 322 days, a mean of 347 days, and a maximum term of 419 days; difference, ninety-seven days.—P. 234.

M. Grille's statement, *Mém. de la Société Industrielle d'Angers*, No. 2, 11e année, p. 55, shows in 114 mares a difference in gestation of ninety-three days.—P. 239.

The observations made by order of Earl Spencer, as to the gestation of 764 cows, show that the shortest period of gestation is 220 days, though the ordinary duration is of 284 or 285 days.—P. 235.

Among sixty-five sows, two littered on the 104th day; ten from the 110th to the 115th; twenty-three from the 115th to the 120th; twenty-seven from the 120th to the 125th; two on the 126th, and one on the 127th day. This is a latitude of twenty-three days.

M. Rainard further gives, from the *Bulletin de la Société Industrielle d'Angers*, the following statement of the duration of gestation in 154 rabbits, viz.: one littered on the 27th day; seven from the 28th to the 29th; fifty-three on the 30th; sixty-one on the 31st; and twenty-nine from the 32d to the 34th day.

These statements show with sufficient clearness that the duration of gestation is by no means a fixed term in any of the observed genera, and I should suppose that the least reflection might lead us to the same conclusion, since the nature of the womb, as well as that of the child, is such as to render it impossible that the laws that govern the contractility of the one or the rate of development of the other, should operate in all cases in equal times and force. The womb of one individual, as well as the fœtus within it, may be ready for the act of parturition earlier or later, according to the force of a variety of causes to the operation of which they are subject.

The duration of gestation must bear some necessary relation to the mass of the fœtus to be developed. Yet, in the elephant, the young at birth stands only about three feet high, which is not higher than the new fallen calf or foal, though the weight must be far greater. In this animal, the gestation lasts twenty months, according to the showing of Mr. Corse Scott, who had one born of a dam in his possession in India. He noted that the gestation commenced about the 1st July, 1793, and terminated about the 1st April, 1795. An account of this elephant may be found in the *Brit. Cyclop. of Nat. History.*

Professor Asdrubali, in his account of the thirteen months' gestation of the Signora N., cites the following passage from Spigelius, who, in speaking of the causes of labor, or of the completion of pregnancy, says: "Hæc nulla alia esse potest, quam maturatio, et perfectio fœtus, quæ fit in utero incerto tempore et variis interdum mensibus, ob facultates corpus fœtus gubernantes vel debiliores vel robustiores."

The same author, Asdrubali, in his *Trattato Generale di Ostetricia Téoretica é Pratica*, tom. v., gives us a succinct relation of the pregnancy and confinement of the lady, the Signora N., who carried twins in the womb over thirteen months.

Probably so great an extension of the uterine life of the fœtuses may excite the reader to feel surprise, and even to a denial of the facts of that case. But I should think that that elegant and learned Scholar, who gives us the history of the pregnancy, ought to be held worthy of our confidence; and I believe it would be difficult to read his fifth volume, which is devoted to the examination of the subject of protracted pregnancy, without being convinced, not only of the sincerity, but of the truthfulness of the author. And it seems to me a very desirable thing that that case should be fully reported in the works on medical jurisprudence for the better information of our courts and juries. I shall at least make an abstract of it in this place.

Case.—The lady, aged 26 years, was married on the 15th of April, 1793. She became pregnant in March, 1795, after having been married 21 months. 23?.+ The child, which was born in December of the same year, died on the 8th day. About the 1st of March, 1796, she was affected with symptoms which induced her to suppose she had again conceived. On the 13th of the same month, she removed to a neighboring district. Upon returning to her residence, she was shocked to find her husband, who was a nobleman, ill with a disease of which he died on the 22d of the same month. To the grief occasioned by the loss of her spouse were added great distress and embarrassment connected with the inheritance of his estate, and notwithstanding she early declared the existence of her pregnancy, she was much tormented and baffled by the relatives of her deceased husband, who treated her declaration of pregnancy as false. At the beginning of the *fourth* month of gestation, she perceived the quickening in the womb. Throughout the fifth and part of the sixth month, the movement in the womb was so violent as to have the appearance of constant convulsive action. Towards the end of the sixth month the motion almost wholly ceased. The abdomen appeared to be cold; the breasts became hard, and there was a discharge resembling whey from the nipples. It was about this time that her family quarrels, insults, and disappointments became most aggravated, and in this condition she passed through the sixth, seventh, and eighth months. At the commencement of the ninth month, she was seized with pains like labor-pains, and discharged from the womb a great quantity of watery fluid. The pains continued to recur during eight consecutive days. They now ceased, as well as the watery discharges, and the lady again began to feel the motions of the fruit of the womb, while the lower belly again recovered its feeling of warmth. The abdomen, which had ceased to grow, resumed its process of development. The breasts ceased to flow, and became flaccid. During the tenth and eleventh months, she experienced a sense of weight in the hypogaster, and had difficulty and pain in the act of urinating. In the course of the twelfth and thirteenth months, she was assailed, first every eight and then every fifteen days, with pains like those she had felt in the beginning of the ninth month. These pains lasted sometimes four and sometimes five hours alternately. On the 22d of April, 1797, she was attacked with symptoms of labor, and on the 29th gave birth to twins. The gestation seems to have continued from March 1, 1796, to April 22, 1797, a period of thirteen months and twenty-two days.

Such is a compendious relation of the case, of which the particulars are given in long detail by Prof. Asdrubali. I lay it before the Student with the assurance that I cordially accept the story of the accomplished author, and that, notwithstanding it presents a rare example of procrastination of the Term, I find in it nothing impossible to believe; the more particularly as I have confidence in the correctness of the following statement of a case that fell under my own clinical care.

Having admitted the patient to my ward in the Pennsylvania Hospital, and having observed and attended her up to and in her accouchement, I rely on the facts as trustworthy.

Case.—Saturday, August 1, 1840. Being at the Pennsylvania Hospital, a lady came to me and requested that, as a medical officer of the House, I would see Ann Gideon, in Clark street, Southwark, in order to her admission into the Lying-in ward. I was told that her confinement, which had been looked for in April, had not yet taken place, that she was suffering under the effects of this unnatural pregnancy, and that the neighbors thought she ought to receive the cares of the Institution. Upon proceeding to Clark street, I learned that she was twenty-six years of age, that she had been confined on the 18th of February, 1839, in the Pennsylvania Hospital, and was again pregnant in the month of July, 1839, while suckling her son. Being very much indisposed, she called a physician, who directed her to wean the child, as she was doubtless pregnant. She did not, however, wean him until September, when she felt sure of her pregnancy. On the 20th of November she quickened, and her husband very distinctly perceived the motion of the child at Christmas. On or about the 10th day of April, 1840, being very large and lusty, she was taken in the night with the symptoms of labor, and called in her neighbors. She said the waters broke in the night and wetted her profusely. After the rupture of the membranes, the pains were great, and she supposed the child would be soon born; but, as the pains not long afterwards grew easier, she did not send for the doctor till morning; at that time, they had become much less distressing; in short, they gradually left her: but she continued big, and could daily, and even now, feel the child when it moved, which gave her great pain.

She was laboring under a decided hectical fever and irritation, that had already very much reduced her flesh and strength. She obtained but little sleep, and had a poor appetite. She daily suffered acute pains in the abdomen. I gave her a ticket for the Lying-in department, to come in on the 4th day of August. The os uteri was found to be not dilated, though the cervix was fully developed, having lost entirely its tubular or cylindrical form. The form of the abdominal tumor was *conical*, the umbilicus being at the apex of the cone. Two or three inches above the umbilicus was the commencement of an oblong tumor, extending to within a very short distance of the xiphoid cartilage, and about three inches in width by two in height. This was a hernia produced by the separation of the linea alba, through which protruded a quantity of the intestine thinly covered and restrained by the peritoneum and skin.

She remained in the ward, suffering daily and nightly with abdominal pains, until she fell into labor on the 11th of September, and the child was born on the 13th of September, about daylight. I sat up with her all night, being deeply interested to observe all the phenomena of the case.

The child, a male, was of a medium size, weighing seven or eight pounds; in good health. The labor was extremely tedious and distressing. She had a pretty good getting up, but the hernia of the linea alba caused great weakness, which was in a measure relieved by a truss made expressly for her. She was discharged October 11th, 1840.

Of course, in relating this case, I do not consider myself responsible for the truth of its statements further than as they are worthy of confidence in view of the character of the patient herself, and as the facts came under my notice. She had the appearance of perfect candor and sincerity in all that she said about it, and I have no doubt she thinks her pregnancy began in July, 1839, and ended, as I have said, on the 13th of September, 1840; having endured near fourteen months, or four hundred and twenty days, instead of two hundred and eighty, the usual term of a pregnancy.

In July, 1841, she is pregnant again, and still suffers from the protrusion in the upper part of the linea alba.

Lamotte, t. i. 313, Obs. xci., relates the case of Madame de ——, who had had children of former pregnancies, and who conceived in the month of January, during which she experienced all the inconvenient sensations to which she had been accustomed in antecedent gestations. In the middle of May, she quickened at the same period as on other occasions. She made her computations for the term, for September. Supposing herself about to be confined, she summoned the monthly nurse, who remained near her until the labor terminated by the birth of a child much larger than the other children had been. She was delivered of the child at the beginning of February, making a case of gestation protracted through thirteen months.

Dr. Merriman, of London, has published, in vol. xiii. part ii. of the *London Medico-Chirurgical Transactions*, a paper on the Period of Parturition, which contains an interesting table of the births of one hundred and fourteen mature children, calculated from, but not including, the day on which the catamenia were last distinguishable.

By this table it appears that three were born in the thirty-seventh week, thirteen in the thirty-eighth week, fourteen in the thirty-ninth week, thirty-three in the fortieth week, twenty-two in the forty-first week, fifteen in the forty-second week, ten in the forty-third week, and four in the forty-fourth week, of which latter, one was born at three hundred and three days, one at three hundred and five days, and two at three hundred and six days.

Dr. Merriman states that he has calculated a great many more cases in the same manner, but has restricted his table to the above one hundred and fourteen cases, because he was able completely to verify them. The others gave results so nearly similar, that he has no doubt of the general correctness of the principle he desired to enforce, which was, that conception takes place, in general, soon after the cessation of the catamenial flow, and not just antecedently to its expected return. The table is highly interesting, in the relations for which I would use it, showing, as it does fully, that there is a considerable latitude in the duration of gestation.

"Mr. Gaskoin communicated an account of suspended animation, during four years, at least, in a specimen of *helix lactea*, now living in his possession. A remarkable feature in this case is the fact that utero-gestation was suspended, and resumed its process with the resumption of vitality."—*Athenæum*, Nov. 30th, 1850.

Computation of Term.—The ordinary term of a gestation is attained in about two hundred and eighty days, and it is customary among medical men to assign the two hundred and eightieth as the day on which the child may be expected to be born. In making the computation for my patients, my own habit has been, to inquire as to the day and date of the disappearance of the last menstrua; to commence the series on the day following the disappearance, and add two hundred and seventy-nine days to it. This mode has answered my purpose well enough, but it is clear that it would not answer for the calculation of term, in the case of a religious Jewess.

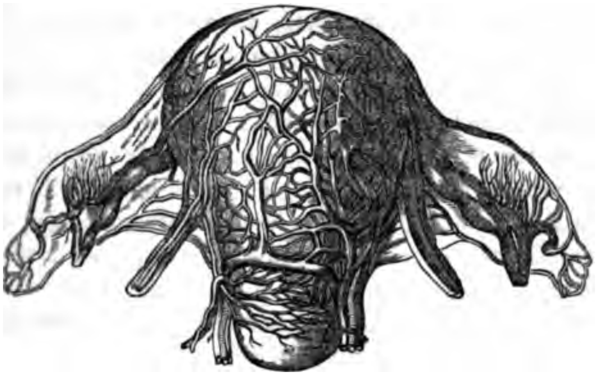
That experienced practitioner, and most judicious author, Professor Nægèle, of Heidelberg, in his *Lehrbüch der Geburtshülfe*, 8vo., 1842, in a remark at the foot of page 82, gives the following method of computing term. Let the woman reckon three months back from the day when her menses ceased, and to the said three months let her add seven days. The day thus found is the one on which she ought to expect her confinement. If, for example, she had her courses last on the 10th of June, let her reckon backward three months, to March 10th, to which she should add seven days, which would bring the calculation to the 17th of March. This would be the day, to wit, March 17th, on which the woman ought to expect her lying-in. Such is the method of calculation recommended by Dr. Nægèle, and it must be admitted that no man in Europe enjoys a more enviable reputation as a teacher and practitioner in our art. One might feel safe in following his example in the practice of it. Still, I cannot perceive why the seven days should be added to the three months, or, rather, to the whole term, since the Professor gives no reason for us to suppose that the ovulum is not both mature and ready for fecundation as soon as the catamenial flow has ceased, and the genitalia have recovered their fitness for the congress of the sexes. As I have had no reason hitherto to find fault with my own method, I shall continue to compute from the day of cessation; so that, if my patient should inform me she saw the last stain on August 27th, I should reckon backwards to July 27th, June 27th, and May 27th, which day I should indicate as the one on which the labor might be expected to commence, and not June 3d. My opinions as to the connection of the menstrua with the acts of ovulation are so settled, that I do not expect they shall be changed hereafter. Still, those opinions do not prevent me from supposing it sometimes possible for an ovulum to become mature, and even to escape from its ovisac, without exciting the usual mensual molimen—and even, also, that this escape might take place just before the period for the catamenial return, or at any other period. Under such fortuitous circumstances, a fecundation might be possible just before the expected return; and if so, the calculations as to term would be liable to give rise to a disappointment. In general, however, one may venture to rely that a general rule will hold good—while no great surprise ought to arise when an exceptional instance happens to fall under notice.

Changes in the Womb.—The form of the womb changes with the progress of pregnancy. The vaginal cervix grows shorter, and at length wholly loses its cylindrical, or tubular shape, leaving at the upper end of the vagina an orbicular or conoidal protuberance with a dimple in its apex, which is the os tincæ of the womb-at-term.

As the ovum expands, it carries the uterus along with it, at first making use of the cavity of the fundus and body of the organ, and only distending the *upper* part of the cervix in the first months of pregnancy; so that, if an examination should be made of a woman three months pregnant, the cylindrical cervix uteri would be found to have undergone very little shortening.

The cervix certainly becomes fuller and larger, at a very early period of pregnancy, and presents, in this respect, a sensible difference from its unimpregnated state. At the close of pregnancy, the tubular cervix uteri seems to have wholly disappeared, and the womb, instead of exhibiting a straight or cylindrical neck, is become conoidal, the os tincæ being at the lowest end. No decided change in the length of the cylindrical part is discovered by the Touch, until after the fifth month, or, according to certain authorities, the seventh month. From that period it grows daily shorter, until the last days of gestation, when it is not to be discovered at all. A pregnant woman, therefore, in whom it has wholly disappeared, is said to be ready to commence the process of labor. The attack of labor pains may begin very soon after the disappearance of the cylinder of the cervix, or it may be deferred for several

Fig. 72.



days, from causes which are not understood. *Figure* 72 *exhibits the form of the gravid uterus, which may be compared with that of the unimpregnated organ, Fig.* 41.

In all instances that have fallen under my notice, the thickness of the walls of the womb, when at term, has been rather less than in the non-gravid organ. The tissue is much looser and easier to cut, and yields to any distending force far more readily in the gravid, than in the non-gravid state. It is incomparably more vascular, so that, in the last weeks of gestation, it may be compared to a purse or network of blood-vessels, with abundance of loose cellular tissue, and muscular fibres interspersed. I have sometimes compared it to a vast hollow aneurism by anastomosis, in order to express an idea of the abundant vascularity with which it is now provided, and by the agency of which it is enabled to fulfil the wants of the fœtus as to aëration and nutritive absorption. The uterine arteries and veins which reach the womb near its lower extremity, inosculate freely with the ovarian or spermatic vessels, that enter its texture betwixt the folds of the broad ligaments, to supply the ovaria, the Fallopian tubes, and upper portions of the womb.

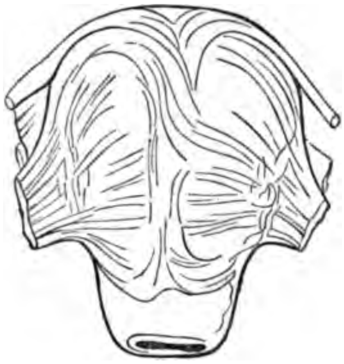
Smellie, vol. ii. p. 19, says that he had opportunities, in 1747 and 1748, of opening the bodies of two women who died at the full term of utero-gestation. The membranes were unruptured. They were each about a quarter of an inch thick. The same was the case with another specimen in his possession, which was in the eighth month of pregnancy. He had seen several others, in which the woman died soon after delivery, the womb not being much contracted, when the thickness of the walls was about the same as the above. But where the death did not occur for several days after delivery, and the womb was contracted, he found its parietes from one to two inches thick. In the cases that I have seen of autopsy of the pregnant woman, I have always found the head of the child to present at the os uteri. I cannot agree with the opinion of M. Paul Dubois that the child is instinctively compelled to turn its head downwards, for I can neither discover any such instinct in the unborn fœtus, nor power to obey it if it should exist. M. Dubois's paper on this subject in the *Transactions of the Royal Academy of Medicine* is, however, well worthy of a perusal.

Uterine Muscles.—With regard to the muscular structure of the womb, I shall remark that no person who has witnessed the exercise of its muscles in labor, can doubt of their immense power; particularly should he have felt its force while the hand has been compressed by it, in turning a child in utero. Some years since, a gentleman of this city found himself obliged to introduce his hand completely into the womb, in order to extract a retained placenta. While the hand was employed in separating the afterbirth from the uterus, the os uteri closed upon his wrist with such force as to give him very severe pain, and he found it impossible to withdraw the hand, which was completely fastened by the contraction. After various unsuccessful attempts to extricate himself from such an unheard-of difficulty, he sent for a Bleeder, and, after causing a large quantity of blood to be drawn from the lady's arm, the spasm of the cervix ceased, upon which he was liberated from an imprisonment of two hours. His wrist was marked, as if a cord had been strongly bound round it; the red traces of which impression were visible, even the next day.

The operation of turning the child, in a powerful womb, from which the waters have been entirely drained, not unfrequently produces a degree of numbness, from pressure, so great as to make it necessary to withdraw the one, and introduce the other hand; the sensibility and motion of the first one being wholly suspended. The resistance to be overcome in the expulsion of a grown fœtus requires a muscular force which cannot be exactly estimated, and must be immense.

Different writers describe the arrangement of the muscular fibres of the uterus in different manners. The very discrepancies of these authors ought to convince us that the arrangement is not yet understood; and, indeed, it is of no great consequence, in a practical view, that it should be demonstrated. It is enough to know that the fibres are so arranged as to tend, by their combined contractions, to reduce the uterus back from the gravid size to that of the unimpregnated organ. When their contraction is co-ordinate, the fundus tends to approach the os tincæ, and the sides tend to approach each other. Whatever is contained within the cavity of the organ is, under these circumstances, expelled therefrom.

Fig. 73.



It should be always understood that, in speaking of the muscular structure of the womb, we speak of the gravid womb only, in which the arrangement and condition of those fibres are perhaps very different from those of the virgin or in the non-gravid organ. Fig. 67 is a representation of their arrangements, proposed by M. Chailly, which differs from the very beautiful drawing of a dissection of them, that is given in Dr. Moreau's Atlas. Both of them are unlike Madame Boivin's figure—and I have no doubt that every successive representation will differ from those that do, or may, precede it. My own attempts to extricate the tangled maze of muscular fibres leave me convinced that the only anatomy of them to be depended on, is the Transcendent anatomy—or that which is performed by the reason and not by the scalpel. He who has felt the womb contract upon his hand in a Cæsarian operation, or in repositing an inverted uterus after labor, or in extracting the placenta in hour-glass contraction, or in turning the child long after the waters are gone off, will have a better conception of the muscularity and of the arrangement and distribution of the muscles than he who trusts to the dissecting knife alone.

The action of the muscles of the womb ought, if normal, to be perfectly co-ordinate, all parts acting together, or at the same time. It is, however, true that, in the state of contraction, all the parts do not always begin and cease to act at the same moment.

Labor does not always proceed with regularity. The muscular power of the womb is occasionally found to be morbidly exercised. Those fibres that tend to bring the fundus near the os tincæ, sometimes fail to act, or act imperfectly; while those that tend to approximate the sides of the womb act with such force as to compress the body of the fœtus, and, instead of expelling, rather confine and detain it within the cavity. We frequently observe women to suffer under the most violent uterine pains, which nevertheless do not move the child downwards in the least degree: such pains should be suppressed, if possible, in order to admit of the co-ordinate and regular operation of all the fibres being restored, by temporary cessation or repose. It is such an action as this that constitutes the hour-glass contraction of the womb, which takes place in consequence of the non-separation of the placenta from the uterine surface—thus disabling that placento-uterine quarter from contracting equally with the rest of the organ. When this happens, the placenta is, of course, shut up within a cell, above the hour-glass contraction.

Obliquity.—The gravid uterus commonly occupies the middle of the abdomen, in hale young women, notwithstanding both the projection of the sacrum and the intrusion of the spinal column tend to give to it an oblique direction: hence, we generally find it to be inclined towards one side of the abdomen in persons of a lax and flaccid habit of body. So far as my observation enables me to speak, it is oblique to the left more frequently than to the right side.

Great degrees of obliquity are scarcely met with in first pregnancies, in consequence of the vigorous contractility of the symmetrical abdominal muscles, which constrain the gravid womb to remain in the mesian line; whereas, in women who have borne many children, those muscles acquire such a laxity and want of tone as to allow the organ to librate from side to side, or fall to the front, according to the attitude of the patient for the time being.

A right or a left lateral obliquity becomes very evident if the woman stands on her feet. In general, if the organ bears over to the right side, its faulty direction will be corrected by turning upon the left, and *vice versâ.* In anterior obliquity, the fundus falls so far forward as to make the patient seem more lusty or larger than she really is. The figure is greatly improved in such cases by wearing a suspensory bandage, which assists the rectus and obliqui abdominis to hold the gravid organ up nearer to the back bone. When a patient suffers herself to be annoyed by what she supposes to be an inordinate development of the womb, her fears may sometimes be allayed by showing her that, notwithstanding she is apparently enormously large, she is in reality not more lusty than common, and that the false appearance depends upon the anterior obliquity of the womb, which causes the belly to protrude unnaturally.

Pressure of the Womb on the Vessels.—Women, in whom the abdominal muscles have not lost their tone by repeated extensions in pregnancy, compress the uterus strongly, in a direction towards the back; whereas, those whose abdominal muscles have become weakened by repeated gestations, carry the child very low, to use a common term, allowing the enlarged womb to rest upon the muscles in front of it. In the former case, the pressure of the organ against the spine must, to a greater or less degree, interfere with the current of blood in the great vessels of the abdomen. Hence the aorta and iliac arteries, and some of their branches, will pass on their contents with less freedom than is natural, whereby the upper parts of the body become supplied with more than their due proportion of the arterial blood. Headache, vertigo, flushings of the face, and tendency to paralysis and convulsions, may fairly be attributed to excessive momentum of the blood thus distributed to the superior parts, and determined towards them by this cause. Sighing, præcordial distress, dyspnœa, and coughs are also found to depend upon the same principle, and are to be treated with a view to lessen this vicious distribution and sur-accumulation of the vital fluids. Venesection, looseness of the bowels, light diet, warm baths, and whatever tends to produce moderate relaxation of the muscular forces, are in general employed with signal success in these circumstances.

Dr. Collins, App. 199, remarks, that "Puerperal convulsions occur almost invariably in *strong plethoric young women, with their first children*, more especially in such as are of a coarse, thick make, with short necks." He adds, at p. 201, "that of thirty cases occurring during his Mastership, *twenty-nine were in women with their first children*."

Can this excess of propensity to eclampsia in primiparæ be attributed to any other cause than those excessive sanguine determinations to the head, above indicated? I might rather ask, if we ought not to expect convulsions in women in the first labor, when we reflect upon the tendency to hyperæmia of the brain caused by the above-mentioned restraints of the downward circulation.

My experience in Midwifery has long since taught me to be watchful of the signs of any excess in such determination of the blood, so that I rarely permit my patients to lie on the back to be confined; for I have been for some time impressed with the opinion, that women who lie on the back in labor, especially in first labors, are more liable to convulsion on account of the greater pressure against the large vessels within the belly; a pressure which, at least, is always relaxed during the absence of pain, in such as lie on the side.

I have frequently met with coughs in the latter weeks of pregnancy, which proved rebellious against all treatment, until the delivery of the patient; after which they yielded to the common means of cure: the pressure of the womb on the abdominal vessels being removed, the pulmonary engorgement and hyperæmic irritation previously sustained and enforced thereby proved no longer indomitable.

The same pressure of the enlarged womb, above spoken of, interrupts the return of the venous blood from the extremities, and the transit of the contents of the lymphatic absorbents. Hence, when that pressure has reached its maximum, the feet and legs become œdematous or anasarcous; the veins of the feet and legs acquire an enormous size, become permanently varicose, and in certain instances burst, so as to cause effusions of blood to take place. In like manner, as has been stated of the superior or arterial engorgements, this inferior or venous engorgement ceases upon the abstraction of its cause. Limbs, when swelled even enormously, are observed to recover their natural size in three or four days after the accouchement. The same general plan of treatment is applicable to both the cases; but it is particularly incumbent upon the medical attendant to employ, in the latter case, rollers for the limbs, that may help their vessels to overcome the distending causes. Where the œdema is very great and painful, punctures with a lancet, extending into the tela cellulosa, allow the serum to escape, and thereby become the means of procuring relief, without the least danger, or any inconvenience worthy of attention. In some cases, the œdema of the limb is so great, that it extends, at length, even to the perineum, the labia, and the lower part of the abdomen. I have mentioned instances in which each labium was swollen to four or five times its natural size, from this serous infiltration. In some of these cases, the tumor has been very hard and resisting. It is proper to remark, in this place, that women who are very much swelled in this way are to be deemed far more liable to puerperal convulsions than such as have no swellings; for these infiltrations, produced by pressure on the ascending venous columns, evince a similar pressure on the descending arterial columns of blood; which gives cephalic engorgement. Good care should be taken to obviate such dreadful attacks. To be forewarned is to be forearmed. I have been blamed by a reviewer for not knowing that this œdema, which ends in eclampsia, is a disease of the kidney giving rise to albuminuria; but I can not, for the reviewer, change my opinion that the difficulty lies in the pressure and obstruction, especially as I find the whole of the œdema to vanish soon after the end of the labor.

That worthy old author, M. Puzos, whose *Traité des Accouchemens* was published in 1755, gives, at page 84, a sensible account of the causation of this œdema gravidarum: "On sçait que cette enflure ne vient que de la difficulté que les liqueurs ont à remonter de bas en haut, et à entrer dans le ventre; parceque le poids de l'enfant se fait bien plus sentir lorsque la femme est deboût que couchée, et s'oppose plus fortement au retour de la lymphe, dans cette situation, que lorsqu'elle est horizontale."

Puzos, it is true, makes a just discrimination betwixt this accidence in Midwifery and a real dropsy; but the Student will be misled, should he not be convinced that the vast majority of the cases of infiltration, no matter how extensive, are owing to pressure on veins and absorbents, and not to a true hydropic diathesis. This accidental dropsy from mechanical obstruction requires no treatment by drugs. Puzos's explanation as to position ought to be remembered, and a confident expectation should be indulged as to a cure, a spontaneous cure, as soon as the obstructing cause shall have been removed, by the birth of the child.

A woman sometimes grows apparently very fat in the last weeks or days of her pregnancy; but the appearance of embonpoint is false —the delusion arising from an insensible watery infiltration of the whole of the superficial cellular tela: instead of increasing her embonpoint, she is really losing flesh by the constant waste of the elements of her blood, and when she comes to her lying-in she complains, a few days afterwards, of growing thin, whereas she may be in reality growing fatter. The deception consists in the elimination of the water of infiltration, which lets her contour down to the true state and expression of her real embonpoint.

Hydræmia Gravidæ.—I have observed that this œdema gravidarum has in many women been attended with some maladive state of the organs or powers of the hæmatosis. In my own opinion, the organ of the hæmatosis is the Endangium, which I have elsewhere called the Blood-membrane. I am not surprised to find that the endangium becomes weakened or diseased in pregnant women, and especially in women whose blood-vessels are occupied in repairing the damage of the blood effected by such vast infiltrations as I have seen among my patients, in addition to the perpetual call upon them for the extraordinary supplies required for the gestation. Such a woman may get rid of the water of infiltration in three days, but she will be of an anæmical appearance for many weeks, and there is danger even of her becoming the subject of a real pathological and not merely accidental hydræmia.

The treatment of such persons consists, due alvine dejections being premised, in the allowance of a nutritious diet, with a portion of wine, and the exhibition of the martial preparations; such as Vallet's mass, citrate of iron and quinine—or, what I deem preferable to either of them, the pill of Quévenne's metallic iron.

Hydatid Degeneration of the Ovum.—A woman who has conceived in the womb, and in whom the pregnancy may have gone on for several weeks, or even for some months in the most regular and orderly manner, is nevertheless liable to subsequent faulty progress in the development of the ovum. For example, the whole mass of the placenta may become the seat of an hydatid degeneration. Hydatids are transparent vesicles or bullæ, colorless, and distended with water resembling pure water. They are supposed by many authors to be independent animals, and were by Laennec denominated as the cysticercus. Mr. Milne Edwards, in his *Elémens de Zoologie—Animaux sans Vertèbres*, speaks of them as belonging to the class of the Helminths or Entozoars. Under the order Cystoid Helminths, genus Hydatina, he says: "Finally, the Hydatids are generally considered as the last link in the series of intestinal worms; but the bodies described under this title are perhaps not real animals, and seem rather to be mere pathological products."

M. Pouchet, also, in his *Zoologie Classique*, p. 537, tom. ii., says:—

"It sometimes happens that women, affected with all the symptoms of pregnancy, discharge a considerable quantity of delicate vesicles filled with an aqueous liquor, that are perfectly analogous to the cysticercus, and that have hitherto been regarded as hydatids. The vesicles seem to adhere by a pedicle to the organ that produces them. Bremser looks upon them as helminths, and says they are really endowed with individual life, and constitute a peculiar species of animals. But several French physicians do not partake of this opinion of the celebrated German helminthologist, and think that these pretended entozoars are commonly nothing more than a pathological degeneration of the product of conception. Such are the opinions of Messrs. Désormeaux, Velpeau, and Orfila, &c."

I have translated the above passages from Milne Edwards, and Pouchet, in order to confirm the opinion I have to express as to the pathological and accidental nature of the placental hydatids. I am inclined to regard them as depending upon an hydropic state of the villi of the chorion, which, by a process of endosmose, under some maladive condition of the life-force of the ovum, is able to convert them into cysts, to the ruin of the product of the fecundation.

When a villous chorion begins to be generally subject of this hydatid degeneration, it is to be deemed that the embryo must necessarily perish in consequence of the destruction of its branchial organ, the placenta, which, after all, is nothing more than a cellulo-vascular process from the chorion. I have seen many examples in which the placenta, at healthful term, has exhibited several of these hydatid-vesicles without harm to the fœtus—while in others, the embryo has been prematurely discharged, accompanied with the debris of a placenta filled with innumerable small bullæ resembling white grapes in bunches.

Let the Student observe that the ovum, when invaded and conquered by this attack, continues to augment in size, its progress being governed by no ascertained law of rate. The healthy ovum has an exact rate—it is finished in nine months; but the hydatid has no certain rate—it compels the womb to distend for its accommodation, and that at a rate which is uncertain. I have seen a young woman, at the fourth month after conception, as large as she ought to have been at the sixth month. It is easy to infer that such a rapid deploying of the womb, one so different from the gentle and lawful rate of a true pregnancy, must have the effects of a pathological, rather than those of a physiological force.

The term to which the development of placental hydatids may attain in any special case cannot be foreseen. The uterus may cease to tolerate their presence in the 3d, 4th, 5th, or even in the 7th month of gestation.

The signs by which they are known are inferential or positive. We infer that the womb contains hydatids whenever we discover it to be increasing with preternatural rapidity; a rapidity that could not be predicated of twins, of polypus uteri, or any tumor. We know that the case is one of hydatids whenever, upon Touching, we can find a softish mass in the cervix which bleeds upon being rudely pressed, and which discharges upon the finger or the napkin specimens of the aqueous vesicles.

As soon as the diagnosis is made, one is ready to take advantage of the commencement of any dilating pain, to provoke the earliest possible discharge of the hydatic mass. This may be done by introducing the index finger into the os uteri far enough to reach and break up the mass. It mostly happens here, as it does in turning out coagula from the womb, after labors, that, as soon as a portion, even a small one, is broken off and discharged, the uterus begins at once to contract upon its now lessened contents, so that, in general, the whole product rushes forth from the violently contracting organ. When, upon the discharge of a quantity of the hydatid mass, the labor-pain ceases too soon, it is well again to break in pieces the rest, so that, when the pain next comes on, there may be less resistance to its expulsion. The Touch reveals to us the truth at last, as to whether all the product is driven off or not.

I have observed that, in the course of a labor for the expulsion of hydatids, the hemorrhage is occasionally most violent, and even alarming. The tampon constitutes an unobjectionable means of arresting such a too tr0ublesome waste of the blood.

Intense constitutional irritation accompanies the hydatid pregnancy in those examples of it where the growth is violently rapid. The over-hasty development of the womb or matrix of the mass may be compared to a bursting process. I leave it to the ingenious Student to study out the problem of the amount of constitutional disorder and its signs, likely to be made manifest upon such sudden and preternatural impetuosity of the uterine growth.

Moles.—Moles are altered ova. In the case of a false pregnancy or Mola, as it is called, we are to presume the conception was normal, but that, upon some accidental failure of the development of the embryo or the secundines, the embryo perished and disappeared. In the mean time, by the operation of a principle of vitality communicated through the uterus, the mass continued to exist and to grow, until the womb, no longer tolerant of the foreign body, must commence a series of contractions, by force of which it is expelled. The mole, like the hydatid, is called a false conception. Neither of them is a false conception; but a true conception, changed afterwards by some accidental diseased action.

Physometra.—There is said to be a false pregnancy called physometra or wind-pregnancy. I have recorded my opinion as adverse to this pretended state, in my *Letters to the Class.* I cannot conceive of a womb distended like a balloon with gas. Some of the reviews with which my *Letters* have been honored find fault with my recusancy as to Physometra and Hydrometra. I receive with the greatest respect, and even thankfully, the strictures that have appeared together with a certain flattering amount of commendation of that work. Notwithstanding the remarks of my critics, I feel constrained to maintain the opinions I there expressed, to which I beg leave to refer the Student.

Hydrometra.—This is a state in which the womb becomes filled with water. The woman, supposing herself pregnant, suddenly finds herself deluged with water that, as is pretended, gushes in a torrent from the uterus, whereupon the signs of the pregnancy vanish away. Inasmuch as I cannot imagine the state of hydrometra, independent of some enormous sac, cell, vesicle, or acephalocyst in which it is contained, and as the supposition of such vast cells is impossible, I adhere to the opinion that Hydrometra is an hypothesis merely. I prefer to suppose the case to be one of over-distended bladder, and the water of the supposed hydrometra to be urine. If the womb should become affected with atresia of the os tincæ or cervix, and it should then fill with a great quantity of fluid, that fluid could not be water. I respectfully, therefore, claim to adhere to the dissenting opinions expressed in my *Letters*, to which again I refer the Student.

Abortion.—The ovum, however well protected by its recondite situation against the operation of any extrinsic causes of destruction, is, nevertheless, obnoxious to several influences that may cause its miscarriage. There are also many intrinsic causes that tend to effect its death; for, since the embryo is composed of a structure, and has functions that are vastly complicated and mutually dependent, it must be liable to disorders that may interrupt its growth, or health, and at last cause it to be thrown off as an abortion.

The embryo is so delicately organized, that very slight changes in the solids or fluids which compose it are sufficient to determine its destruction.

Its blood, out of which all its tissues are composed, is moved by its own powers of circulation, and it must, like all other living beings, be subject to engorgements, inflammations, hemorrhages, and all the other maladies that consist in derangements of the circulation.

Such a creature might perish from very slight faults in the power of the omphalo-mesenteric vessels, or the umbilical vessels—and unequable development of its more important internal organs doubtless serve, in many instances, to deprive it of vitality. Of the vast number of cases of early abortion, I presume a large majority depend upon disorders of the embryo itself, and not upon disorders or accidents happening to the mother.

While this is probably true, it is to be observed that the union of the placenta to the surface of the womb is so slight, that it is easily peeled off; so that a blow upon the region of the womb may destroy its connection, and blood become at once effused betwixt the placenta and the uterus; if a great quantity be effused, the whole surface of the placenta may be speedily detached or loosened, and of course, the ovum, now deprived of the sources of growth, must perish.

A sudden and very violent excitement of the blood-vessels, as by surprise, anger, &c., may cause the effusion of blood from the placental superficies of the womb. A contraction of the womb may break the connection. A violent concussion of the body, as by falls, jumping or rude motion in carriages or on horseback, may cause a detachment to take place; or the membranes of the ovum may be so weak and delicate as to burst upon very slight compression of the womb, as in coughing, straining at stool—upon any sudden and powerful exertion, falls, blows, &c. Thus it appears that the abortion may be caused by the death of the embryo; by disease of the secundines; by sudden violent movements of the blood, causing the effusion of that fluid behind the

ita; by direct violence, or by the discharge of the water of the
m.

he ovum be ruptured, there is a discharge of water from the vagina,
antity of which will depend upon the age of the embryo. This
ner or later followed by pain, and flowing of blood. The pains,
are uterine contractions, become more and more frequent and
lerable, until the ovum or its remains are expelled, when the
ing begins to diminish, and, for the most part, the pain returns
re. If any cause should have been applied that could detach a
n of the placenta without rupturing the ovum, many hours, or
several days might elapse, before the blood that follows the de-
ent should appear at the orifice of the vagina: the blood must
orce its way betwixt the chorion, or decidua, and the surface of
omb; but as soon as it reaches the orifice, it falls into the vagina,
hen there is what is called a *show*. If the fœtus perishes by an
al disease, or in consequence of some disorder that happens to
upon any part of the ovum, the further development of that ovum,
the embryo ceases, and it is cast out by the contractions of the
, sooner or later, according to circumstances. For the most part,
rum, soon after it has lost its vitality, becomes an irritant or ex-
t of the womb. On not a few occasions, however, the dead ovum
ns within the uterine cavity for weeks or even for months, without
ng its contractility—cases that are among the most embarrassing,
count of the diagnosis, that the obstetrician can possibly encounter.
lead ovum of three months may not be expelled until the seventh
hth month of pregnancy. It undergoes no putrefaction, unless
nembranes have been ruptured; in which case, it cannot remain
long undischarged.

ere are some individuals in whom there seems to be so great an
bility of the muscular fibres of the womb, that the presence of
uit of a conception never fails to bring on the contractions before
mpletion of the term of pregnancy; and I apprehend that this
sive irritability is among the common causes that produce abor-
This view seems to be maintained by a reference to what hap-
in those who have already miscarried, since such females are
to be greatly disposed to miscarry again, at about the same
l as that at which they had sustained the first misfortune; which
rs to me to indicate that the repeated accidents of this kind are
utable, rather to an excessive or abnormal irritability of the
, than to any of the other circumstances that are enumerated as
tive of abortions; for it is far more reasonable to suppose that

the *same* uterus is endowed with too great a degree of muscular irritability, than to suppose that several successive germs should be so constituted as to perish always at about the *same* period.

A woman becomes pregnant by the fecundation and subsequent fixation of a deposited ovulum. The act of fecundation can only take place after the ovi-posit has happened. The conception does not necessarily put a stop to the periodical development of ovarian ova—nor to their maturation and fall. But a woman who menstruates because of her ovi-posit, will tend to menstruate at regular periods, though she have conceived in the womb. Some women have this tendency so strongly, that they do actually menstruate during the earlier months of their gestation. Mrs. K. menstruated until the eighth month of her pregnancy.

Every woman who menstruates in her pregnancy is trying to miscarry; and she would miscarry if the monthly hyperæmia, giving rise to menstrual hemorrhage, should cause the outflowing blood to destroy the connection between the ovum and womb. If she does not miscarry in such cases, it is because the blood escapes from the uterine superficies below the surfaces occupied by the ovum in the cavity of the organ, or because the connection of the ovum to the womb has become a sufficient bar to the discharge of blood from its uterine vessels.

The above may serve as an explanation of the very common opinion that a woman is most liable to abortion at periods coinciding with the menstrual effort, and there is good reason to believe that a great number of abortions do take place at those conjunctures. It is reasonable to suppose that the periodical hyperæmia of the reproductive organs that causes menstruation would, should it occur in pregnancy, expose the woman to the risk of miscarriage—and it is equally reasonable to take especial precautions against such an occurrence for those women who have, on former occasions, suffered the loss of the ovum, at or near to the menstrual periods, and without any other assignable causes.

Whenever, in abortion, the contents of the gravid womb come to be expelled from its cavity, that expulsion is effected by a real labor, often severely painful, and requiring for its completion many hours of greater or less suffering, sometimes many days.

I have had the medical charge of the same women in regular labor and in abortion; and they have informed me that, for acuteness and severity of pain, the abortion has far exceeded the labor at term. This is not always, nor perhaps most generally, the case. The reason why some women suffer so acutely in miscarriages is that the canal of the cervix uteri requires for its dilatation, in the early months, a great deal of ower to be employed in forcing the embryo, which at that time is contained in the cavity of the body and fundus, down through the long narrow anal of the cervix uteri; and the distress produced by this dilatation of long and rigid canal must often be as great, and might *à priori* be upposed as great, as that occasioned by the dilatation of the os uteri t term, which in the last days of pregnancy has become thin and ielding; whereas, in the early months, the whole cervix, as well as the s uteri, is of an almost cartilaginous hardness and rigidity.

At the beginning of the effort to miscarry, the womb is shaped like Figure 74. The egg lies in the cavity made out of the expanded *corpus et fundus*; but, before the ovum can be expelled, the long cylindrical neck must first be converted into a cone, like Fig. 75. But, after the cervix has been altered in shape, so as to become a cone, the ovum cannot escape until by a further process of dilatation that cone is turned in a wide open cylinder, whereupon the ovum is thrust forth and falls into the vagina, as in Fig. 76.

Fig. 74.

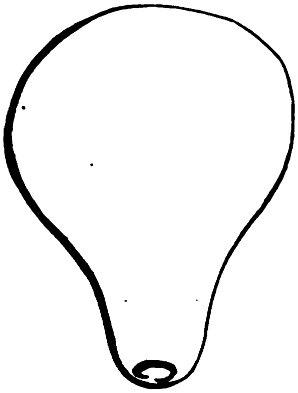


Fig. 75.

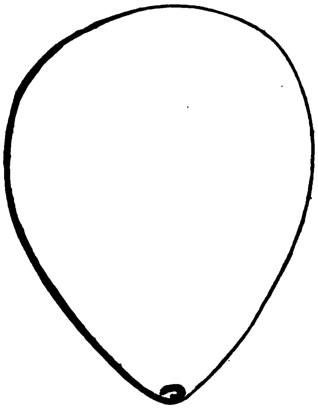
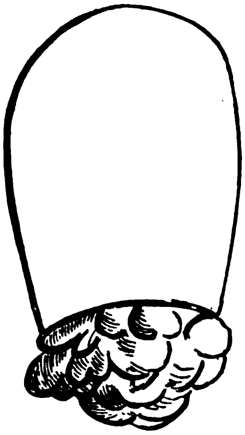


Fig. 76.



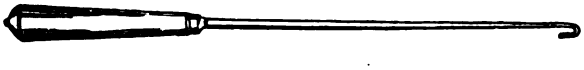
Abortions sometimes take place very easily, with little pain, and almost without hemorrhage; but the quantity of blood lost in some instances of miscarriage is enormous; probably on account of the extreme degree of uterine irritation or sanguine molimen which the act of abortion develops. The hemorrhage is apt to continue until the contents of the womb are expelled; and it is, therefore, highly important to expedite that occurrence by all reasonable means. Unfortunately, these means are few.

Upon taking charge of a case of abortion, it is the Student's duty to ascertain which of two indications he ought to pursue. First, he should decide whether he will attempt to save the pregnancy, by preserving the vitality of the ovum; and second, he should determine whether any moral probability now exists of the death of the ovum. In the latter case, it may demand his respect no longer; in the former, he will act against duty if he fails to do whatever may hopefully tend to the conservation of the fruit of the womb. The quantity of blood lost already may serve in some degree to enable him to decide both these questions; for, if the pregnancy be not much advanced, the loss of a considerable quantity of blood is evidence of so incurable a detachment of the fixed ovum as to preclude any reasonable expectation of its continuing to live in the womb.

Besides his inquiries and observation as to the quantity and force of the hemorrhage, he should carefully ascertain by Touching the existing condition of the os and cervix uteri. Therefore, whenever the flow becomes so considerable as to affect the pulse and the complexion of the patient, it is imperatively required that the medical man should ask for an examination per vaginam; and he will sometimes find that the ovum is sticking in the cervix, and needs only a little aid to escape from it—but, while it remains, it cannot but keep up the hemorrhage. The fore-finger may, in such instances, be pushed as far as practicable within the canal of the cervix, along side of the ovum, and then bent so as to resemble a blunt crotchet. By the aid of the finger, used in this way, and the assistance of powerful bearing down on the part of the woman, the offending cause is without much difficulty removed, and the effect ceases. When the finger cannot be employed, Dr. Dewees's placenta-hook may be employed.

I annex a figure (Fig. 77) of Dr. Dewees's placenta hook or crotchet, which is on some occasions a convenient instrument for pulling down the ovum when merely held by the cylindrical grasp of the cervix.

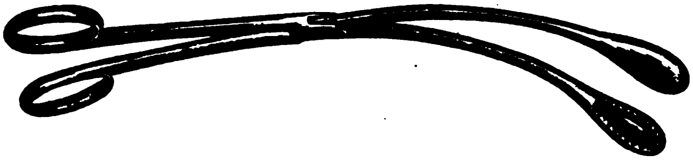
Fig. 77.



Dr. Henry Bond, an eminent practitioner of this city, has proposed a placenta forceps for the delivery of the secundines in abortion, of which Fig. 78 is a representation.

Dr. Bond's instrument is ten inches in length, and so rounded that it is difficult to conceive of an operator awkward enough to pinch with it any of the parts of the mother. An inspection of the drawing suffices, without further explanation, to give an idea of its usefulness.

Fig. 78.



While I lay before the Student these instruments for the extraction of the dead ovum, I ought to warn him against too facile a disposition as to the employment of them, and to assure him they will often disappoint his expectations, and sometimes, where they do succeed, lead to evil consequences as to the mother. The ovum, in abortions, inhabits the body and fundus uteri. The cervix stands guardian as *facultas retentrix* over the deposit, and reluctantly yields it a passage. In doing so, the conical neck of the womb must become a cylindrical canal, into which the fundus and corpus uteri thrust their intolerable burden. When this cylindrical canal hath received into its calibre a small ovum, or the remains of one, it has, of itself, little or no power of expulsion, but merely grasps the ovum and holds it fast. It holds it sometimes for many days. I have found it to hold the ovum in this manner for many consecutive days, because the very os uteri would not let it escape, failing to yield, chiefly perhaps because no dilating pressure was applied. In the long run it yields, the os tincæ becomes wide open, and then a bearing-down effort, a fit of coughing, or straining at stool or urine, drives it forth into the vagina. (*Vide* Fig. 76.) Now, until the canal has become truly cylindrical, Dr. Bond's forceps and Dr. Dewees's hook are not to be employed without much care and gentleness. For the most part, it is better to wait until all is prepared, and then remove the object with the index finger.

In those cases in which a proper attempt to extract the debris of the ovum has failed, those who like the support of high authority may console themselves by referring to Puzos, who at page 193 says that, "cette terminaison est bien moins effrayante; mais elle est bien plus longue; j'ai vu de ces fontes durer six semaines à deux mois; et pendant tout le temps, où les vuidanges sont si fœtides, j'ai vu ces femmes tourmentées de fièvres irrégulières de dégoûts et d'inquiétudes." He thinks these cases ought to be left to nature.

If, upon making examination in abortions, the state of the cervix is found to be unfavorable to the speedy expulsion of the offending cause, and the hemorrhage be not too threatening, recourse may be had to the application of napkins, wrung out of cold vinegar and water, to the hypogastrium and pudenda; to the administration of dilute aromatic sulphuric acid; to the acetate of lead, with opium; or to the preparations of secale cornutum—as the powder, in doses of five to ten grains repeated *pro re natâ*, or its vinous tincture, of which a teaspoonful may be given every half hour, or at intervals of one or more hours, according as the events of the case seem to demand. A powder consisting of five grains of alum and one grain of nutmeg may be given as a hemostatic every half hour or hour. The lancet may be resorted to, to aid both in diminishing the hemorrhagic nisus and in favoring the dilatation of the cervix, to which nothing contributes more powerfully than venesection. This, however, should be used with great and good discrimination.

Tampon.—But above all the means of putting an end to troublesome hemorrhage, I ought to applaud the tampon, or plug. This tampon may be composed of a sponge; or, what is far better, of pieces of cotton or linen cloth or patent lint, torn into squares of from two to three inches, which may be pressed into the vagina, one at a time, until that entire canal is filled and distended with them. They should be kept there by a napkin, worn as for the menstrua, or by pressure with the hand of a nurse, a napkin being interposed, until the flow is effectually checked, at least. The tampon may be allowed to remain *in sitû* from six to twelve, or even to twenty-four hours in winter. When removed, it is generally followed by the ovum, or its remains, which are frequently found attached by a coagulum to the upper part of the tampon. Should any dysury be caused by its presence, the bladder may be readily relieved by the catheter while the woman preserves a horizontal posture, which should never give place to a vertical one until all probability of a return of the hemorrhage has disappeared.

I do not understand how a woman can be permitted to die with hemorrhage, in an abortion, while materials for a tampon are at hand, since the discharge may always be effectually controlled by it. The remedy gives no pain, if properly used; and, so far as my experience of its employment bears me out, it never causes any considerable inconvenience; while, I may add, it always succeeds.

A good many cases of abortion, in the early stage, as from the sixth week to the tenth week, have fallen under my notice, in which the uterus was unable to expel the remains of the ovum, and in which I could not extract it. The female, in such instances, save one, has always recovered without the ovum having been visibly discharged; but there always was an excretion, continued for many days, of offensive, dark-colored grumes and sanies, which I accounted for by supposing that the substances in the uterus had become macerated, and came off in a state of semi-solution, as in the instances above cited from Puzos. I think that there is no danger in leaving such occurrences in the hands of nature; and that it is better to do so than reiterate attempts to extract by force, that have perhaps already proved quite vain; especially, considering that there is as great danger of exciting inflammation by those attempts as could be anticipated from the gradual maceration of the ovum. Let the Student reflect upon the demonstration made by my Figures 74, 75, and 76, and he will perceive that an attempt to take away the ovum, before the womb has become changed from Fig. 75 to the form of Fig. 76, not only ought to fail, but must fail of success. I am not disposed to deny that the presence of a putrefying substance, even of a small size, in the womb, is capable of developing violent inflammation and fever; but it has not happened so in my cases, and I have given the same opinion to some medical friends, by whom I have been consulted, without the least cause to regret having given such advice. Let me be clearly understood, however, to recommend that the last remainders of the ovum should be brought off, where it is practicable, by employing any reasonable efforts to do so.

I shall not omit the present opportunity for repeating, with regard to the tampon, that it is not a proper remedy for those cases in which any hope is yet entertained of saving the pregnancy.

Let us suppose an instance in which the placental attachment has taken place at the fundus uteri; that a partial detachment of the placenta has happened; and that the blood, having forced its way in a narrow stream, or rivulet, betwixt the womb and the outer surface of the ovum, has at length made its appearance at the pudenda. Nothing is more common than to see such cases of *show* suppressed by venesection, recumbency, an opiate, some doses of elixir of vitriol, or cold lemonade. Should any practitioner, anxious to promote the formation of a coagulum, and thereby stop the effusion of blood and save the pregnancy, have instant recourse to the tampon, what would be the consequence? The blood, instead of escaping externally, would be forced back on the ovum, while the newly effused portions of it, instead of flowing by the route already formed, would continue to dissect off or separate the ovum more and more, until the whole of it should be detached, and at last come off, enveloped in the centre of a compressed clot. To use the tampon, therefore, is to ensure the abortion; hence it is only a remedy for the hemorrhage of abortion, and not a remedy for miscarriage, which it not only cannot prevent, but actually ensures, or renders certain. The blood which continues to flow into the womb, after the vagina has been closed by the tampon, may be compared to a river dammed across its channel, and whose waters, in consequence, overflow their banks, drowning the adjacent country.

With regard to the tampon, I have further to add that its employment in advanced stages of pregnancy, although allowable in certain instances, demands very great discrimination, inasmuch as it is capable of converting an open into a concealed hemorrhage, as we shall have occasion more fully to remark when we come to the consideration of uterine hemorrhage, in labor. It may, under the proper indications, be with safety employed up to the close of the fifth month of gestation; since the womb, until that period, is incapable of admitting sufficient quantity of blood to give any well-grounded fears of a fatal concealed hemorrhage. But at a later stage, the capacity of the uterus is so much increased that the tampon, if employed at all, ought only to be used while the practitioner himself carefully observes its effects, remaining at hand to remove it in case the uterine cavity should become distended, and filled either with fluid or coagulated blood to a threatening amount. I was told, not long since, of an instance in which a gentleman, treating a case of hemorrhage after delivery, was pressingly called for to visit another woman in labor, and as he felt compelled to go, he tamponed the vagina with his handkerchief, by which means he effectually suppressed the apparent hemorrhage, but, upon returning shortly afterwards, he found the patient dead; the womb having filled with blood, instead of that fluid having escaped at the vulva—just such a conclusion to the affair as ought to have been expected from the use of the tampon under such circumstances.

It has on several occasions happened to me to see the tampon injudiciously employed in this way. Two of the persons were nearly expiring, when I arrived and immediately removed them; and one other, for whom it had been applied early in a flooding labor, without placental implantation, was expiring when I reached the house—a dreadful case of mala praxis, to which I shall recur in a future page.

Prolapsus.—It is commonly thought that women who suffer under repeated abortions are quite as much, if not more, subject to a consequent prolapsus uteri than those who are confined at full term. The natural tendency of labor is to produce a prolapsion of the womb, and that tendency must be much greater where the vagina has been much distended and pressed out of its ordinary form, than where the vagina has not been so affected. This might lead one to deny that abortions are as likely to bring on a state of prolapsus as labors at term. But those women who miscarry are, for the most part, not sick any longer than during the actual miscarriage. They generally get up, most imprudently, the next day, or in some instances even on the same day. The solid and weighty substance of the uterus now bears down the vagina, to whose upper extremity the organ is attached; and the vagina, weakened and relaxed by the discharges of the miscarriage, and ofttimes after abortion affected with vaginitis, makes less resistance than is common, so that the womb takes permanently a much lower level in the pelvis than it ought to have. All the difficulties and embarrassments likely to accrue from this vicious situation of the womb, might be obviated by a little patience and prudence in the beginning. The woman should be warned, in clear intelligible language, that too early a getting up exposes her to the risk of suffering from a falling or bearing down of the womb, which may ruin her health and thereby render her unhappy for life. Unfortunately, she feels too well to believe that our words are other than useless and needless vaticinations, and so she is not willing to maintain a recumbent posture more than one or two days.

It should be considered that while a woman, lying-in, is in a physiological state, one laboring under miscarriage is in an opposite condition—that she is sick, and often needs care not less sedulous than the other one requires. The womb is in fault, as to the miscarriage in some of the cases, and any man conversant with the events of our obstetric practice knows that the organ is occasionally left by abortions inflamed, or hyperæmic, and irritable to the last degree. In these instances, the organ is situated much as it is when affected with hypertrophy. Long-continued uterine tenesmus, sanguine affluxion, enfeebling discharges, and persistent pain, might well be expected to result in a descent or prolapsus, scarcely to be avoided by those who suffer frequent distressing abortions, and especially by those who pay not the least regard to the common-sense dictates of the medical man.

Retroversion.—In proportion as pregnancy advances, the womb increases in longitudinal diameter; so that, if it should from any cause happen to be turned over backwards, the top of the fundus uteri would lodge in the hollow of the sacrum, while the os tincæ would be pressed upon the symphysis of the pubes, or above it. The fact of such a displacement being occasionally met with cannot be doubted, and the inconveniences and dangers arising from it are too numerous to admit of my passing over it here without a few remarks.

Considering that the antero-posterior diameter of the pelvic excavation is equal to four and a half inches, it is reasonable to suppose that the unimpregnated womb cannot readily be caught under the projection of the sacrum, even if it be liable to be thrown backwards under that promontory. Yet the unimpregnated uterus is liable to be turned over, or retroverted, and retained in that false position, until the reposition of it be effected by a skillful hand. The womb is about two and a half inches long; but, as the vagina is attached by the recto-vaginal septum to the gut behind, it appears that if the fundus uteri should be caught, in retroversion, below the promontory of the sacrum, it might readily remain there, until, as above said, it should be reposited by the hand of the attendant. There is no reason to doubt that the uterus is frequently turned over backwards, but not retained; for the urinary bladder, when very full of water, extends backwards and downwards, pushing the top of the womb along with it. If this happen to a woman about two and a half or three months gone with child, she will scarcely fail to have a serious retroversio uteri.

There are persons who bring on these uterine deviations by a bad habit of retaining the urine until the bladder becomes over-full. Such, at least, is the opinion I have formed from inquiries addressed to the patients themselves.

Some women, from a fastidious delicacy, or from circumstances of the society in which they pass their waking hours, fail to yield to the ordinary solicitations of nature as to the discharge of the urinary bladder, and allow that organ to become so distended that it equals the bulk of a pint or even a quart measure, before they take notice of it. So great a bulk as this occupying the space behind the lower portions of the abdominal muscles and betwixt them and the sacrum, cannot but put upon the stretch both of the ligamenta rotunda, which is equivalent to the effect of thrusting the fundus uteri down upon, and even below the promontory of the sacrum.

Can there be any doubt that such a habit, persisted in for years, would result in the state of retroversio uteri?

Case.—I saw this day, July 12, 1848, a young lady of 22 years of age, who has been married now ten months. She presented all the external characteristics of fine health. She has never conceived. She has a constant pelvic distress, and has suffered for eight years with the most distressing dysmenorrhœa, informing me that she never had her catamenia without very violent pain. The menstrua are abundant and regular. She uses a dozen napkins at each period, and sometimes more than a dozen. There is severe pain in coitû, which cannot be perfectly effected.

I found the os tincæ half an inch behind and below the crown of the pubal arch—and the fundus uteri occupied the recto-vaginal cul-de-sac. It was bent, with a short turn backwards.

Upon causing her to turn over upon the face, I readily reposited the womb—but it came down again upon the least motion. Now this person had never had any considerable illness, or met with any accident. When I pressed the index finger firmly on the lips of the os tincæ or on the cervix, she felt acute pain, and said the pain was the same in kind as that of her dysmenorrhœa. Her habit has always been to retain the urine long, so that sixteen or twenty ounces frequently collect before she discharges it. Can there be any doubt this habit is the cause of the retroversion? There is no other discoverable cause.

Suppose the fundus of a gravid uterus to be caught and detained under the promontory, as just above mentioned, and that the child proceed in its growth, carrying with it the womb in which it is enclosed; the consequences must be a complete impaction of the womb into the excavation—a total prevention of the flow of urine, by pressure on the urethra—a stoppage of the canal of the rectum—severe pressure upon the internal sacral foramina, with their nerves; and, unless by timely measures obviated, the certain and miserable death of the patient. In the case examined by Dr. Hunter, so completely impacted or jammed was the womb into the cavity of the pelvis, that, after the death of the patient, it was found impracticable to get the uterus up out of the excavation, until the pubis was cut through with a saw, in order to admit of the enlargement of the brim of the pelvis. It is difficult to conceive of a situation more frightful than that of a patient under such circumstances. The case, with the fine illustrative engraving, is contained in Hunter's Tables of the gravid womb.

As to the retroversions that follow pregnancy, I conceive that they are the after-labor results of non-contracting ligamenta rotunda. When the womb has attained its full size, at term, the round ligaments have become much elongated, rising high up in the abdomen to their points of origin near those of the Fallopian tubes. If now the uterus, in a labor of some four hours, condenses itself, and in some fifteen days afterwards nearly recovers its non-gravid volume and weight, it does not necessarily happen that the round ligaments shall be equally prompt in their own reduction to their usual state. But, if they continue flaccid, relaxed, and elongated, nothing is left to hold the womb in proper propinquity to the symphysis pubis—it falls over against the promontory, is pushed beneath it by the distending bladder, and held in such dislocation by the mechanical form of the curve and the promontorium.

My experience teaches me that most of the instances of retroversion are attributable to a distended bladder, whether after parturition or no. The modest delicacy of women often compels them to resist the most urgent desire to pass off the urine. A female riding in a carriage, or placed in such a situation that she cannot withdraw from the company without being suspected of a desire to urinate, will allow the bladder to fill almost to bursting; and if she be pregnant about three months, she will scarcely fail to have retroversion of the womb. When at last she obtains an opportunity to evacuate the bladder, she finds she has a partial or total suppression of urine. The usual recourse is had to spirits of nitre, to watermelon seed or parsely-root tea, and perhaps a dose of castor oil may be resorted to; but as relief can only come by some mechanical remedy, the medical man is at length, and reluctantly, sent for.

CASE.—A few years ago, I was called to a young woman who had been a short time married. She arrived in town by one of the public conveyances from the eastward. She had a constant and irrepressible desire to urinate, and could only succeed in getting off a few drops at a time. She told me she was pregnant; had just arrived from a journey; and that she was suffering the most acute distress from the constant inclination to urinate. As the disorder had come on suddenly and in a state of high health, I at once told her she had a retroversion, the nature of which I explained to her, and she submitted to the necessary investigation; upon which I found her womb turned over, and upon repositing it she was immediately cured. I suppose that, in traveling, her bladder, for want of an opportunity to empty it, had become very much distended; that its bas-fond had pressed upon the anterior superior face of the womb more and more as it became more and more distended, until the fundus uteri, jammed under the promontory of the sacrum, could not get out again, without the aid of a physician.—See my *Letters to the Class, sub voce.* One of my critics condemns the rapidity of my diagnosis in the case. I respectfully refer him to the passages in which I explained that, by using the method of exclusion in the analysis, I could not possibly arrive at any other opinion.

To see a healthy-looking woman seized with complete retention of urine, without having been before the subject of any urinary ailment, is always warrant enough for us to suspect a retroversion of the womb, especially if the patient be at the time pregnant, and not advanced beyond the fourth month. The symptoms of which such patients complain are either a total retention, a stillicidium, or a great dysury; with pains about the region of the pubis and sacrum; constant tenesmus, or bearing down, and a sense of obstruction or stoppage in the rectum.

No case like this ought to be suffered to pass without making an examination per vaginam. For this purpose, let the patient lie on her back, near the right side of the bed; the feet drawn up near to the breech; the head and shoulders raised with pillows. The physician should stand by the bedside, and with his left hand placed upon the hypogastrium, ascertain if the bladder be much distended: it will sometimes be felt almost as high up as the umbilicus. The forefinger of the right hand may next be carried into the vagina in order to seek for the os tincæ, which is to be found behind the symphysis pubis, or even thrust over and above it: the vagina seems to be obstructed by a hard body, which is the bas-fond of the womb, whose fundus is turned down into the hollow of the sacrum, and jammed into the cul-de-sac composed of the reflexion of the peritoneum, which lines the upper posterior third of the vagina and the front of the rectum.

Having thus verified the existence of a retroversion, the next steps required to be taken are those that are demanded for the repositing the womb. Among the most pressing indications of cure, is the relief of the suppression of urine, which in general is easily fulfilled by the introduction of the catheter, which should be a male catheter, composed of the French elastic material. A long one is the best, because the womb, in changing its own position, carries up the neck of the bladder, and thus elongates the urethra so very considerably, that it will be found convenient to use a long instrument for the evacuation of the water.

Inasmuch as the most ordinary cause of retroversions is a distended bladder, it has been thought that the removal of this distension is the sufficient remedy, it being supposed that the uterus might recover its attitude as soon as the pressure which overset it should be taken off. Indeed, there are cases in which the restoration takes place soon after the bladder becomes emptied. I have related, in my *Letters on Woman, &c.*, cases of retroversion cured by the catheter alone, and one, from an English authority, in which a most dangerous case of retroversion in pregnancy, which could not be cured by the hand, gave way to the use of the catheter, left for a long time in the bladder, by which means that organ was completely hindered from filling up, and obstructing the tendency of the fundus to rise upwards to its natural situation. It has well been contended that, for retroversion of the gravid womb, a sound discretion indicates the propriety of leaving the case in nature's care, after this preliminary measure has been accomplished, lest, by any rude or too persevering attempts to replace the uterus, the ovum might suffer so much injury as to bring on an abortion. I admit that I am not prepared to decide as to the necessity for such great prudence, since I have only on one occasion put it to the test. On that occasion, I drew off the urine two successive days, the accumulation being very great; and then, finding that the malposition was not rectified, I was compelled to replace the womb with my hand: no inconvenience whatever followed the operation, although the patient was near four months complete gone with child. In a subsequent pregnancy, the same person suffered a retroversion of the womb, nearly at the same period; and when I was called to see her, I immediately proceeded to restore it to the proper attitude. In this case also the pregnancy was not in the least interrupted.

Having succeeded in drawing off the water, the patient, if necessary, should have a copious enema, in order to unload the rectum, which, if replete with fecal matters, might offer considerable obstacles to the success of our attempt. In the next place, we ought to endeavor to raise the fundus, the patient lying on her left side, by pressing the bas-fond of the womb, which can be felt through the hinder surface of the vagina, upwards, with the fingers, so as to lift the whole mass in a direction parallel with the axis of the brim. The cervix uteri is tied to the more anterior parts of the pelvis by the vagina and the vesico-vaginal septum, so that, if we carry the mass considerably upwards, it must be by tilting the fundus in that direction. Attempts of this kind will not always succeed. Where they fail, a finger may be passed into the rectum, the forefinger of the left hand if the woman is on her left side, and of the right hand if she be upon her back. Before the finger has passed very far, it meets with the fundus uteri, which presses upon the canal of the intestine; in this situation, we have far more power to move the womb than when the effort is made only from the vagina. Pushing gently and steadily upwards, we find the mass gradually to recede, until at length the fundus, liberated from its restraint, suddenly emerges, with a sort of jerk, from under the promontory, from which instant the woman is cured.

I have sometimes failed of success, until I placed the patient in a more favorable attitude; one in which she could not bear down, and thus oppose the success of my measures. I have directed that she should turn on her face, then draw her knees up under her until the thighs were in a vertical position, giving to the pelvis the highest possible elevation: the cheek was to be placed on the bed without pillows, and the point of the thorax was also to be touching the bed. Lying in this posture, the power of mere gravitation might suffice, in time, to unhitch the fundus uteri from beneath the promontory; since all tenesmus and bearing down are thus arrested. After waiting a short space, until the effects of the position were secured, I have pushed up the fundus very easily by acting either through the vagina or the rectum.

A pregnant woman, who has just recovered from a retroversion, ought to lie in bed two or three days, and should not, for a few days, be left more than six or eight hours without evacuating the bladder, spontaneously or by the catheter, lest that organ, filling again, should unhappily a second time depress the fundus, and thus cause us to lose all our trouble through want of a moderate precaution.

The gravid womb, doubtless, becomes, in four months and a half, too large to admit of the occurrence of retroversion: but the accident may occur at any period short of it; it may take place not only in the non-gravid, but in the virgin uterus.

CASE.—On the 22d of February, 1828, I was called to visit Elizabeth B., aged about twenty years. She had complained for several months past of dragging pain in the left side of the abdomen, with a sense of weight and great uneasiness within the pelvis. She has menstruated regularly. For the last three weeks she has been persecuted with constantly repeated and painful desire to go on the stool, and with symptoms of strangury, or dysury, amounting often to stillicidium urinæ. After a careful inquiry into the history of her case, I informed her of the nature of my diagnosis; and she at length agreed to permit an examination by the Touch, as I assured her that I had no means of relief for her, if there were really a retroversion, short of the Touch. In this painful necessity she submitted, with a laudable unwillingness, to the operation, and it was with no little difficulty that I at length carried the finger beyond a remarkably strong hymen, into the vagina. The os uteri was found near the symphysis of the pubis, and the fundus was discovered overturned into the Douglass's cul-de-sac. After a long perseverance in endeavoring to raise the fundus, I was compelled to attempt it with the forefinger of the left hand passed into the rectum, by which method I pushed the uterus up; whereupon she immediately declared that she was fully relieved of the sense of weight and pain that had so long been tormenting her. She continued well from that moment. I consider this a case of considerable interest, inasmuch as it further proves the possibility of a long-continued retroversion of the womb in the non-gravid and virgin state of that organ.

There are some persons to be met with, in whom retroversion takes place so readily, that the least exertion of strength brings it on. In a single individual, I am sure that I have been called on to restore it to its position twelve or fifteen different times. So great, in that case, is the tendency of the womb to turn over, that it has several times occurred, notwithstanding the presence in the vagina of a very large globe pessary, and I do never regard her as exempt from the probability of an attack except when in a state of advanced pregnancy. I presume that in her case there is not only a great relaxation of the vagina and its connecting media, the recto-vaginal and vesico-vaginal septa, but there must also be supposed to exist a condition of the ligamenta rotunda, which has allowed them to become elongated to such an extent that the least pressure on the anterior face of the womb pushes it backwards and downwards. No one, I think, could suppose a case of retroversion, without at the same time implying that the round ligaments, which pass from the angles of the organ out of the abdominal canal, and abdominal rings are lengthened—and even stretched. A permanent elongation or laxity of those ligaments would add a great facility to the disposition to oversetting of the organ.

As there is reason to believe that there is a character of muscularity attached to the round ligaments, proceeding as they do from, and being composed of the same tissues as the womb, we may indulge, in any case, the hope that time, if not drugs and medicines, will bring them back to their natural tension and length, so as to obviate the evil propensity to the retroverted state of the uterus.

The accident of retroversion may be considered serious and dangerous just in proportion as it occurs at a more advanced period of pregnancy; for, according as the pregnancy is of an older date, is the necessity greater for a speedy reposition of the organ. I have, I think, pointed out sufficiently at length, the dangers to be apprehended from a retroversion continued until the whole mass becomes so impacted into the excavation, as to render its extrication, without abortion, impossible. As I have met, hitherto, with no example in which it was impossible to replace the gravid organ, I do not feel it incumbent upon me, at this time, to do more than refer to the severer methods of extricating the woman: these are, first, the artificial rupture of the amniotic sac, which, by allowing the water to escape, reduces the size of the womb so much as to enable the operator to succeed in restoring it to its proper position; or, lastly, the puncture of the womb itself, when it is found impossible to reposit or pass a bougie into the os uteri.

The Student ought early to become aware that some of these retroversions are rendered incurable by the formation of adhesive deposits that tie the fundus uteri close down to the back part of the pelvis; and that, as these adhesive bands cannot be approached with the bistoury nor otherwise broken up, the womb is liable to remain in a state of permanent retroversion. M. Amussat mentions two such cases, in his Essay on retroversion, and I have met with two, one of which only was verified by the necroscopy. I shall publish one case as drawn up by Dr. Yardley, and illustrate it by a cut copied from a drawing by Mr. McIlvaine, who had the specimen before him; and which constitutes one of the most interesting preparations in the Museum of the College. The following is the history of the case, as drawn up by Dr. Yardley himself, who allows me to publish it here.

CASE.—"Mrs. N—— became my patient in the spring of 1840. I visited her on account of a diarrhœa which had continued for some time, and which was attended with distressing pain in the left side.

"A regulated diet, saline frictions of the skin, which was cold and dry, together with small doses of mass. hydrargyri, opium, and ipecacuanha, soon cured the diarrhœa; but, as the pain in the side and other symptoms of disease still continued, I was induced to investigate the case more fully. I then learned that, since her marriage, about three years previously, she had had two attacks of uterine hemorrhage, which were pronounced by her physician to be abortions; though nothing like an ovum had ever been detected, and he had never examined the state of the uterus.

"The first attack came on on New Year's day, 1838, after taking a very long walk; and, though the hemorrhage was not profuse, it was attended by such excruciating pain in the side, on being moved, that it was necessary to bring her bed into the parlor, where she remained several weeks. The hemorrhage and pain gradually subsided, and by the 1st of June, she appeared to have regained her usual health.

"The second attack took place April 12th, 1839, and came on suddenly when making some unusual exertion while engaged at her toilet.

The pain was so severe as to cause fainting, and was attended by vomiting, diarrhœa, retention of urine, tenesmus, severe bearing-down efforts, and slight uterine hemorrhage. These symptoms were mitigated by general treatment, without resorting to the catheter, or making a vaginal examination. She was confined to her chamber nearly three months under this attack, and was still suffering from its effects when I was consulted in her case. Her menses were irregular; her bowels frequently disordered; she was unable to take her accustomed exercise, on account of a bearing-down pain and distress in the pelvic region, which was increased by exertion of any kind. Her husband informed me that since her last attack she had always suffered severely from sexual intercourse.

"I considered these symptoms sufficiently indicative of disease or displacement of the uterus to call for an examination of the state of the parts. I found the uterus low in the pelvis, hot and swollen, and so sensitive as to preclude further exploration. Rest in a recumbent position; bleeding; cupping over the sacrum; and general antiphlogistic treatment, in ten days, produced so much relief that the patient declared herself better than she had been for more than a year. I then made a second examination, and found the engorgement, heat, and tenderness much diminished; but there was considerable prolapsus, and the uterus and vagina were morbidly sensitive.

"I was desirous that the patient should remain longer in the recumbent position, but the weather being warm, and confinement very irksome, I introduced a gilt-ring pessary, and sent her into the country.

"Mrs. N—— returned about the middle of September. She informed me that, for three weeks after the introduction of the pessary, she felt unusually well; she was able to stand and walk without suffering, and the distress in the pelvic region was much mitigated;—but about that time, when using considerable exertion, she felt the instrument move, and it continued to trouble her until it came away. After the displacement of the instrument, her old symptoms returned, though for a time she was better than before its introduction.

"After keeping the patient quiet a few days, I made another examination;—all morbid sensibility of the parts had now subsided, so as to admit of a full exploration, and, for the first time, I detected in the hollow of the sacrum, a round, hard body, with a deep indentation between it and the lower part of the neck of the uterus.

"It was difficult to decide whether this was a tumor, or the fundus of the uterus bent down in that position; but, after a careful examination, I was disposed to regard it as the latter, though it was much lower and more prominent than I should have expected from the situation of the os tincæ, which was not more anterior than is usual in simple prolapsus of an equal degree.

"After pressing up the uterus as far as I could, I introduced a gilt-globe pessary under the fundus, hoping it would gradually restore the organ to its proper position, and that, if it came away, the patient could replace it herself, which was important, as those repeated examinations were very disagreeable to her.

"The globe pessary was retained but a short time, and as it caused considerable pain and uneasiness during its retention, the patient was unwilling to have it again introduced.

"At the suggestion of Professor Horner, of the University of Pennsylvania, I next placed the patient on her knees in the bed, with her head and shoulders as low as possible, and introduced an instrument into the rectum under the fundus of the uterus, and by that means, assisted by its own gravitation, endeavored to dislodge it from its position. In this manner, I succeeded in pressing the uterus up much higher than before, and after again introducing a ring pessary, I requested the patient to remain quiet for a few days. This ring kept its position two weeks, and was productive of much relief; but it then came away, and the unpleasant symptoms returned.

"This process of pressing up the uterus, and introducing a pessary, was repeated several times; and it was found that a ring pessary was the only kind that was of any advantage, for, while a ring retained its proper position, the patient was comparatively comfortable. This relief, from the use of a ring pessary, appears remarkable, when, after death, it was discovered in what manner the uterus was bound down to the rectum; there is, however, no doubt of the fact, and it may be explained by supposing that the anterior wall of the rectum was pressed forward and upward, or the adhesions stretched.

"The difficulty of retaining the ring in its proper position, however, seemed to increase; rings of silver gilt, glass rings, ivory rings, rings of hard wood, such as ebony and lignum vitæ, and rings of gum elastic were all tried, but the gilt rings were found much the best.

"Discouraged by my want of success in the treatment of the case, I sought further counsel, and Professor Hodge of the University of Pennsylvania saw her with me, July 10th, 1841. On examination, he readily detected a retroflection; a displacement of the uterus with which he was familiar, and which he calls a retort uterus, from the fact that the uterus is bent on itself in the form of a retort.

"He proposed the introduction and persevering use of a pessary of a peculiar form, which he has successfully used in many cases of the kind; I had an instrument made after his pattern, and introduced it; but it was not of the proper size, and caused considerable discomfort, which the patient attributed to the form of the instrument, and, to my regret, was unwilling to have another one of the kind used.

"During the following five years, she pretty much abandoned medical treatment, except that, whenever her sufferings became unusually severe, she applied to me, when, by pressing up the uterus and introducing a ring, she would be much relieved for a time. Several other physicians were consulted in the case, but nothing important or novel was suggested.

"Her symptoms gradually grew worse, and in July, 1847, I visited her, and found her confined principally to her bed; she appeared slightly emaciated; her brilliant color was gone, and she suffered severely from sickness of the stomach. She informed me that, after passing her monthly period about three weeks, she had had a slight show, which had returned every few days for the last two weeks; making about nine weeks from her last regular monthly period. On making an examination, I found the uterus occupying the same position it had heretofore done, and somewhat larger than before, but apparently not larger than an ordinary unimpregnated adult uterus.

"I declined adopting any active treatment without assistance, and suggested Professor Meigs, of the Jefferson Medical College, who saw her with me on the 17th of July. Dr. Meigs was sanguine, after examining the state of the parts, that the uterus could be restored to its proper position, notwithstanding the length of time it had been displaced.

"He came next day prepared with an instrument to press up the fundus of the uterus, and with some small gum-elastic bottles, of the kind recommended by Hervez de Chegoin, in the hope that by gradual pressure in this manner we might succeed in restoring the organ to its proper position.

"The patient complained of much pain when the doctor attempted to press up the uterus, though but moderate force was used. I filled the bottles with curled hair, which I found to answer admirably on account of its elasticity, and introduced one of them carefully between the perineum and the fundus of the uterus. It gave no pain, and was retained without inconvenience, and appeared as though it would fulfil the indication.

"I kept her in her bed a few days, after which she rode out occasionally, and once walked several squares.

"On the evening of the 5th of August, after using much more exertion than she had done for several months, the ball was forced away, and she was attacked with severe bearing-down efforts, so that it was a considerable time before she could be removed to her chamber. After she had been carried to her bed, I made an examination, and found the uterus at the os externum, and the bearing-down pains so severe as to threaten its expulsion from the vagina.

"After administering an anodyne enema, and in some measure tranquilizing her system, I succeeded in pressing the uterus up to its former position, and introduced the gum-elastic ball at her own request, as she said she felt safer and more comfortable while it was *in situ*.

"The patient was unable to leave her chamber, and seldom her bed, from this time; and she often passed whole days and nights in the most awkward positions because the least motion increased the pain beyond endurance. Her stomach became so irritable that it was seldom anything would be retained in it even for a single hour. She became weak for want of nourishment. The most excruciating neuralgic pains pervaded every part of her abdomen, so as to preclude the possibility of any examination either externally or per vaginam; and to increase the difficulty of diagnosis, she became tympanitic.

"The wise women of the neighborhood said she was in the family way; but of this we were not satisfied; and Dr. Meigs, who placed considerable reliance on the appearance of the nipple, examined her breasts carefully, and there was not the slightest change of the areola.

"An anodyne enema was administered every evening, but her nights were generally sleepless, and she gradually grew worse till the 19th of August, when I was obliged to leave the city for a few days. My friend Dr. Jewell attended her for me, and has furnished me with the following notes of the case:"—

"My first visit to Mrs. N. was made on Thursday, August 19th, at the request of my friend Dr. Yardley, who was to be absent from the city for several days.

"Her condition, when I saw her, was anemic; countenance thin, pale, and sallow, expressive of long-continued and wasting disease; pulse sharp and frequent; abdomen tympanitic and exceedingly tender to the touch; tongue clean and moist; stomach so exceedingly irritable as to reject all nourishment and medicine, craving only ice, which, however grateful for a moment, afforded no relief. All her suffering was directed to a most excruciating pain in the left iliac region, accompanied with extreme gastric distress, which symptoms had been in existence, and increasingly so, for several days.

"Fomentations of brandy and spices were applied to the abdomen, and various anti-emetics and sedatives were ineffectually tried for the vomiting.

"In the afternoon, the symptoms being more aggravated, twenty-five leeches were applied over the stomach, and an enema of forty drops of laudanum in a gill of warm flaxseed tea thrown into the rectum. In the course of the night, the gum-elastic ball pessary, which had been introduced by Dr. Yardley for the retroversion of the womb, came away during an effort to vomit, and was not replaced.

"Friday, 20th. Found her very weak and exhausted, with some slight relief from pain and vomiting; expressed herself to be easier, but dreaded the return of the severe suffering she had experienced the day before. Was troubled with flatulency and slight oppression at the præcordia. Directed the effervescing draught, with thin arrowroot, in small quantities, and to be frequently repeated. The fomentations to be continued as yesterday.

"In the afternoon, was sent for in haste—that Mrs. —— had convulsions. On my arrival at her bedside, I found her in a collapsed condition, insensible, extremities cold, pulse and breathing scarcely perceptible, and her whole appearance completely blanched. By the persevering help of stimulants and artificial heat, she gradually revived.

"I learned from the family that, previous to her insensibility, she had complained of an agonizing pain in her left side, and an increase of sickness at the stomach, and in a few moments after went into convulsions.

"So forcibly was I struck with her bloodless condition at this time, I remarked to her husband that she had all the appearance of one who had lost a great amount of blood from flooding.

"Being comfortably restored, before I left, I ordered her brandy and water; ice in small and repeated doses, with essence of beef; and to repeat the enema of laudanum and flaxseed tea if the pain returned, together with the following prescription in doses of twenty drops every hour:—

℞.—Solut. sulph. morph. ℥i;
Hoff. anod. liq. ʒij.

"During the three following days, the vomiting continued with very little abatement. Every attempt to administer nourishment or medicine was indomitably resisted by the stomach, with the exception of the brandy and the morphine solution. On each successive day an anodyne injection was given, to subdue the attacks of pain in the left side. Her pulse, in the mean time, was feeble and frequent, her countenance blanched, and her whole condition so much exhausted as to afford but slight hope of her recovery. On Tuesday, 24th, however, there was an apparent amendment in her case; her pulse began to react, she was able to retain a little nourishment, the vomiting had in a great degree subsided, and her expression was, 'I feel comfortable.' Her bowels not having been open for several days, I ordered her a turpentine enema, to which they responded readily, though not freely.

"Wednesday, Aug. 25th. Had passed an easy night, but without much sleep; upon the whole she had improved, was cheerful, had taken a cup of tea, and had eaten some calf's-foot jelly; the tenseness and tenderness of the abdomen had subsided. I could make considerable pressure without causing either pain or sickness, and for the first time I was able to detect a tumor in the left iliac region, upon which spot, however, she could not allow pressure without acute pain.

"I felt quite encouraged with her appearance and the improvement in her symptoms, as did also her friends. Feeble hope was given that she might be restored. She asked for a peach, which was allowed her, and I left her in good spirits.

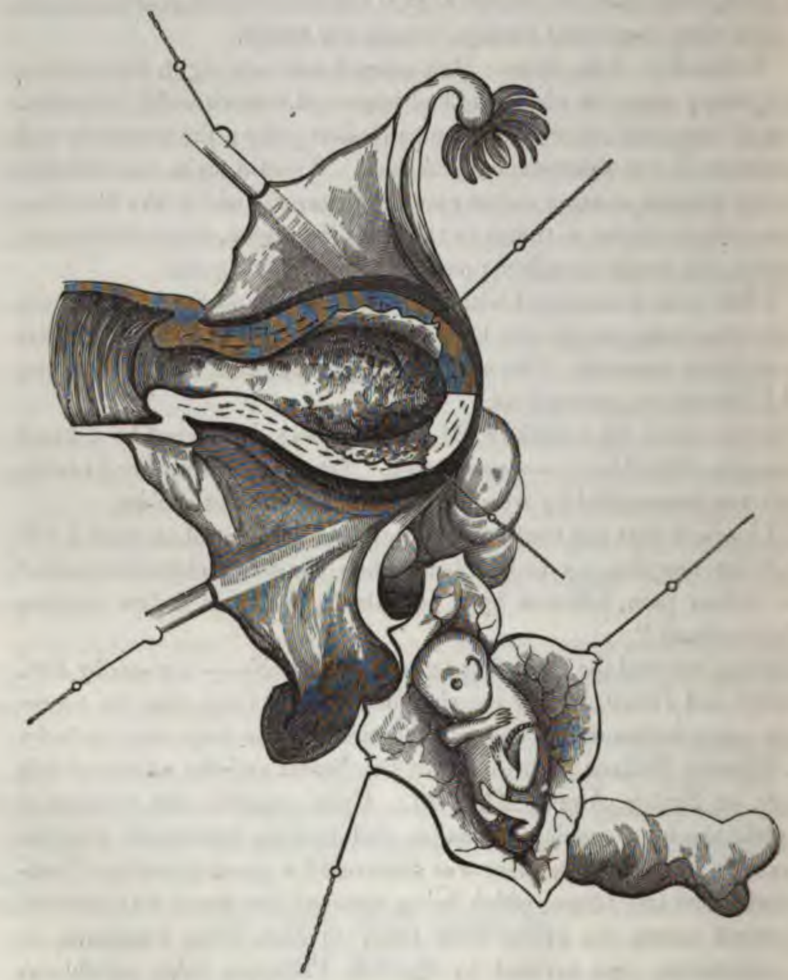
"It was near 3½ o'clock, P. M., when I was summoned by a hasty messenger, that Mrs. —— was dying. On approaching her bedside, which was surrounded by weeping friends, I found her lifeless.

"I learned that she continued as well and as cheerful as when I left her in the morning, up to 3 o'clock, when she was suddenly attacked with violent pain, followed by a convulsion, which in a few minutes ended in death."

Having inserted the foregoing account of Mrs. N——'s case, by Drs. Yardley and Jewell, it only remains for me now to say, that the necroscopic examination of the body of this unfortunate lady was made by Dr. Ellerslie Wallace, in presence of Dr. Jewell and the author of this article, on Friday, August 27, 1847. Upon exposing the contents of the abdomen by a crucial dissection, and looking downwards into the excavation of the pelvis, there was discovered a great quantity of coagulated blood and serum, which being removed, the uterus was observed to extend across the pelvis from front to rear, lying horizontal in the excavation, and covered by the left Fallopian tube, which was turned over from left to right quite across the pelvis coincidently with the transverse diameter. The tube was enormously enlarged, having been converted into a sac which contained a fœtus of near three months, developed in a tubarian gestation.

The uterus being measured, was a little more than four inches long, and at the broadest part three and three-quarter inches wide. The child-bearing Fallopian tube could be lifted up from where it lay upon the front surface of the womb—no inflammatory attachment having as yet been formed to bind them together. Upon lifting the tube-sac off the uterus, and then attempting to raise the fundus uteri out of its retroverted position, it was not possible to succeed, in consequence of the adhesive bands and bridles that bound it to the lower part of the sacrum. When these adhesions had been divided by the scalpel, Dr. Wallace could lift the fundus out of its bed, and reposit the womb. This I had been unable to effect during Mrs. N——'s lifetime, either

Fig. 79.



with the hand or with Hervez de Chegoin's caoutchouc pessary. I was not surprised to find the fundus glued in this manner to the lower part of the sacrum, for I had, in June, announced to Dr. Yardley my belief that it was adherent—an opinion founded upon the firm resistance of the tumor to all my attempts to reposit it. I may remark here, that I believe the womb might have been got out of its false and adherent position by means of the caoutchouc pessary, by slow and cautious proceeding, had not the tubal pregnancy unhappily supervened. I suppose that the adhesions might have been gradually broken or absorbed under the elevating power of M. Hervez's method.

The rupture of the tube had occurred near its outer end, which, from its being turned over and laid upon the prostrate womb, was found nearer the right than the left ischium. Through the edges of laceration in the tube-sac, one of the feet of the embryon was protruding. The uterus and its appendages were removed, with consent of the friends.

Upon laying the uterus open, it was found to be filled with a deciduous mass and with bloody slime. The cavity was somewhat enlarged, but the paries of the uterus was very thick, like that of a uterus contracted after delivery. The tube was now laid over to the left, its natural position, and opened; whereupon it disclosed the embryon, as in the figure, which was taken by Mr. M'Ilvaine *ad vivum*. The deciduous membrane is seen in the cavity of the uterus, its edges being laid over on the cut surfaces.

I regard the case as an interesting one, from its showing the presence of its decidua in utero in a tubal pregnancy, and more especially as presenting an example of adherent retroversion; and, perhaps not less so, as exhibiting tubal pregnancy in a woman with adherent retroversio uteri.

Extra-Uterine Pregnancy.—I have met with three cases of extra-uterine pregnancy in the tube, all of which proved fatal about the third month, and I should expect the death of the patient to take place, at or before the third month, in any case; since it is improbable that the tube can ever furnish the material for a matrix for more than some ninety days, at which time the tube-sac must become so much thinned and extenuated by its expansion as to burst. The rupture of the tube will be attended with fatal hemorrhage, because, being the seat of gestation, it has become highly vascular, in order to the carrying on of the gestation within its walls. I do not believe that a tubal pregnancy will ever be suspected until it has burst and begun to bleed. One of these cases I have just related, as drawn up by Dr. Yardley, under the head of retroversion.

If a woman should experience the signs of pregnancy, as to change of the aureole, as to nausea, pica, and malaccia, as to growth of the breasts, extraordinary sensation within the pelvis, &c., and thereupon, when having attained to the middle of the second or to the third month, be seized with horrible pain in the hypogastrium and pelvis, turn pale, lose the pulse, and faint—I should suspect the rupture of a tube-sac of extra-uterine pregnancy. It is true that the above symptoms might be expressions of affections of the ureter, or perforation of the bowel; but, in case they should continue and increase, with signs of concealed hemorrhage, so as to leave no doubt of imminent death, I think the diagnosis could not be other than a ruptured tube-sac of gestation.

Such a diagnosis would not lead to any hopeful therapeutic or chirurgical intervention, for nothing is to be done in these melancholy cases beyond the adoption of mere palliative measures. No man would be mad enough, under such diagnostic, to perform a gastrotomy operation.

CASE.—I had, some years ago, a young woman under my care who supposed herself to be pregnant some two or three months. One morning she took the broom to sweep her chamber-carpet, when suddenly she felt agonizing pain in the left iliac and pelvic region, which extended through the belly. She fainted, and became mortal pale and pulseless; the agony was terrible. I suppose she had ruptured the sac of a tubal pregnancy. She expired in the course of a few hours, with all the symptoms of hemorrhage in the abdomen. I could not obtain permission to examine the body.

CASE.—I saw another case, which I shall relate in this place as follows:—

Mrs. ———, aged thirty-two, a healthy woman, mother of four children, was in excellent health on Sunday, October 7th. At six o'clock in the morning, she was singing and playing with her children. At seven o'clock, her husband, who was sick up stairs, heard her ascending the staircase, and groaning heavily; when she entered his room, she appeared alarmingly ill. A physician, Dr. ——, was sent for, and found her with a pulse one hundred and forty; in violent pain, extending from the top of the thorax on the right side, quite down to the iliac region. He attended her all day, applied a blister to the right side of the belly, gave a cathartic, &c. She passed a dreadful night, but was easier at eight o'clock next morning; the pulse then one hundred and twenty. He left her for a short time, but found her worse on returning to the house. I was sent for, and arrived at half past two o'clock. She appeared to be dying at the time of my arrival. As she had vomited very much, and had a most excessive tympany, with violent pain in the whole belly, she got an enema, which brought off a great deal of stercoraceous matter, without sensible relief. In half an hour, she said, "Raise me up—my breath is leaving me." I raised her a little on the pillows, and she swooned and died. Twenty hours after death, I opened the abdomen, and found it filled with about thirty ounces of blood, and bloody serum. The whole pelvis was filled with coagula, and a great quantity of blood was among the bowels.

This blood came from a ruptured left Fallopian tube, which contained a fœtus of six or seven weeks. The ovarium was somewhat enlarged. The womb had a deciduous lining, and the canal of the cervix was filled with a claret-colored mucus or lymph. The womb was larger than a non-gravid womb, though not a great deal larger.

I have not had under my care any cases of ventral or abdominal pregnancy, though I have had opportunities to witness the examination of bodies of persons perishing from this dreadful accident. I shall merely express some doubt that I feel as to the propriety of any gastrotomy operations in such cases, save mere incisions for the escape of the contents of the suppurating sac and the remains of the fœtus.

I refer the Student to the records, for samples of life not only continued long after the complete development of the abdominal fœtus, but of good health enjoyed notwithstanding. The late distinguished incumbent of the chair of midwifery in the University of Pennsylvania, Prof. James, published an account of a lady who carried out a normal pregnancy, notwithstanding she had in the abdomen an extra-uterine fœtus which she carried many years.

Signs of Pregnancy.—I have been, on several different occasions, both vexed and amused upon observing how prone are some medical practitioners to overlook the signs of pregnancy even in married women, their patients.

One gentleman, of great experience, tapped a woman for ascites—but his trocar went into the gravid womb and penetrated the shoulder of the fœtus. She fell into labor, and recovered of the accident; the child had the mark of the trocar on his shoulder. She afterwards suffered from strangulated hernia of a knuckle of intestine, that escaped through the trocar-opening in the linea alba. This hernia being reduced by Dr. Pancoast, she recovered happily. At a subsequent period, the protrusion again occurring, the gut was fatally strangulated. Professor Pancoast, who made the post-mortem examination, preserved the specimen in the Jefferson College Museum. Many instances of the strangest oversight have occurred within my range of observation; instances in which the size of the belly, the married state of the patient, and the obvious evidences of gestation, as well as its probability, ought not to have been overlooked, nor mistaken for diseases requiring troublesome, disgusting, or dangerous therapeutical prescription.

The safest rule would be to suppose every married woman of the proper age, with suspension of the catamenia while not giving suck, as pregnant, and to treat her as gravid until convinced of the contrary.

Case.—Mrs. ———, aged thirty-six, multipara, resident in Philadelphia, was ill on the 15th March, 1850, with diarrhœa, attended with very distressing tenesmus. That able physician, Dr. ———, attended to her during three days, and then left her in apparent good health. She was supposed to be, at the time, one hundred and twelve days gone with child. She had no doubts as to the pregnancy. Ten days after the attack of diarrhœa, March 25th, she began to grow rapidly larger, and the belly soon became so enormous, and so painful from tension, as to induce her to send again for the doctor, who found her, as he supposed, affected with a vast ascites, consisting of many quarts of fluid contained within the peritoneal sac. I know not on what day Dr. ——— first saw her again. The secretion of urine was nearly abolished. The reins and lower part of the abdomen were very painful, yet there was no pain produced by pressure or by palpation. No signs of pregnancy save that the cylindrical cervix was short as in a woman of seven months, and the cone of the cervix, felt in the vaginal cul-de-sac, expanded. The os uteri was well closed.

Neither palpation nor auscultation disclosed the reliable evidences of a pregnancy. Still, the woman insisted that she was pregnant and quick with child.

She became affected with nausea and frequent vomiting. She grew thin, and got a haggard expression of the face. She was costive. There was not the least œdema of the limbs or face. Under these circumstances, Dr. ——— announced his desire to tap the patient, which he looked on as the only hopeful means of arresting the vomiting, which now caused her to throw up the whole of the ingesta. The pain from abdominal tension was almost insupportable, and the emaciation extreme.

On Monday, April 22d, I was called in consultation. She vomited everything—was in *great* distress from the distension of the belly. Pulse frequent and energetic. Tongue clean. She was tolerant of pressure in every part of the abdomen. The vaginal touch revealed to us nothing to be depended upon, though made with great care. Protracted and anxious auscultation of all the parts of the abdomen, disclosed no fœtal sounds, and long palpation no fœtal turbulency. The patient insisted upon the gravidity, which I could neither affirm nor deny.

Upon consultation, it was agreed to defer for the present the idea of a tapping. She took citrate of magnesia, which purged her well and brought an end to the vomiting. She then took acetic tincture of squills, combined with sweet nitre, for I fully believed in the existence of ascites having at least sixteen quarts for the collection, and I gave this as my opinion, concurring with Dr. ———, physician in chief. I did not deny nor affirm the pregnancy.

On Thursday, May 2d, at noon, Dr. ——— was called to her in labor, which soon terminated in the birth of twins, of five and a half months, the first born being faintly alive for a few minutes, and the second quite dead.

While Dr. ——— sat at the bed foot, a vast quantity of water (a great many quarts) gushed from the ruptured membranes; a very large bucket-full, was the doctor's expression. Soon after this, the twins were expelled, and then the placentas united in the disk were removed.

To-day, May 30, 1850, I saw her at noon. The womb is firmly contracted in the lower part of the belly, though very large, being about five inches in transverse by seven in longitudinal diameter. I do not think there is any, the least degree of effusion in the peritoneal sac, and the patient is in every respect comfortable.

I do not suppose that I have ever been concerned with a more instructive case than this. Dr. ———, an able and most experienced physician, who has had about 6000 labors, mistook the developed belly for an ascitic tumor, an opinion in which I wholly concurred after the most careful observation, the employment of all the proper means of diagnosis, and serious reflection on the history of the case.

I never have met with a more fluctuating dropsy than this one, the waves being most distinctly and clearly perceptible, in whatever direction propagated by the percussions. *It was dropsy of the ovum.*

My objection to the paracentesis depended upon two points; first, the risk of peritonitis from the wound, and second that of interfering with the uterus, provided she were really pregnant.

But for this hesitation she would have been tapped, and that with my consent, which I was on the point of yielding!!

Let the perusal of this most interesting case serve as a memento for the Student in all instances of such sudden dropsies, complicated with averred gestation. Let the distress of this patient be referred to the same category of influences that occasion so much constitutional irritation from the too rapid growth of the womb, under hydatid gravidity, as in my case, related at p. 242 of this volume. I was greatly shocked, this morning, to find how grave a mistake in diagnosis I had made, and equally relieved to find the patient delivered of her twins and her ascites by the same gush. I beg the Student not to forget this lesson, and I hope he will refer to it before he taps a female of whom it is *possible* to suppose that she is gravid.

Let the Student also imagine for a moment, how very disagreeable must be the reflections that follow the clearing up of so egregious an error as that of administering powerful emmenagogues to married women, who, nevertheless, would not miscarry; or who, now and then, are found to miscarry under such a diagnosis. The signs by which a woman knows herself to be pregnant are, the cessation of her regular menses, and the subsequent enlargement of the abdomen, the movements of the fœtus, certain constitutional or local disturbances or disorders, and modifications of the mammæ. A married woman, who has been well regulated, suspects that she has conceived, if she fails to menstruate at the proper term; but this cannot be considered as conclusive evidence of conception, since so many and such various causes are found to obstruct and avert the regular course of the menstrual function. A second failure, especially if it be not accompanied with any signs of depraved health, renders the suspicion still more valid; while after a third and fourth omission, the change of form, and at last the perceptible motion of the embryo put all doubt to flight. I may say, however, with great confidence, that the audible or palpable movements of the fœtus afford the only true and infallible signs of the existence of pregnancy. But, the audible are far more to be relied on than the palpable signs, at least after the sixth month.

There are many accidental or correlative signs which establish a probability of the existence of pregnancy: among these I may mention nausea and vomiting; a gradual increase or development of the mammæ, a change of the areola of the breast, which becomes more protuberant or elevated, and acquires a dark brown hue, much to be relied upon, especially in first pregnancies. The nausea is mostly found to occur in the morning, and is attended in some individuals with a distressing heartburn, and salivation or spitting of saliva. Some people are affected with gravel, or dysury, from the extension of irritation to the neck of the bladder, or from pressure of the enlarging womb upon the posterior surface of that organ. An irritable state of the temper indicates it in some women, which is attributable to the general malaise that must attend the gastric embarrassments which the early stages of pregnancy are so commonly found to produce. Toothache, earache, styes on the eyelids, morph on the skin; a dark aureole around the eyes, and strange, unaccountable longings or appetites, are also signs of pregnancy, rather to be noted after pregnancy is fully ascertained, than to be depended upon as sure evidences of its existence.

By means of the Touch, pregnancy may be pretty surely ascertained, before quickening has taken place, but not surely. By the Touch we can readily learn that the womb is enlarged, altered in form, and contains something; but I do not see how any physician can absolutely aver what that something is, unless he can perceive a spontaneous motion in it; so that even the *ballottement*, or tilting the embryo upon the point of the finger, does not furnish, to my mind, any sure evidence that the tilted body is an embryo. I adhere, therefore, to the opinion I have already expressed, that we have no certain signs of pregnancy except those derived from the visible, palpable, or audible motions of the child.

Auscultation, either by means of the stethoscope or the direct application of the ear to the abdomen of the woman, enables us to perceive two very distinct sounds, one of which is the beating of the heart, and the other is that which has been called the *placental souffle*, *bruit de souffle*, or bellows-like sound; the latter being occasionally attended with a sound like the cooing of a dove. Whenever we can distinctly hear the beating of the fœtal heart, so as even to count the number of its pulsations, all doubt must be at an end. The placental sound, or the *souffle*, is a very distinct sound, which has been supposed to indicate not only the presence of a fœtus, but also that it lives; the rushing or blowing sound being said to always cease as soon as the fœtus expires: it was said to be, in some way not yet sufficiently understood, connected with the movement of the blood in the placenta, and to cease, of course, with the cessation of that movement, which is itself dependent on the systole of the fœtal heart.

Upon a more scrupulous inquiry as to the value of the *bruit de souffle*, in the diagnosis of pregnancy, it has at last been found that the earlier opinions of it were erroneous, and I believe that there are few well-informed physicians to be now met with who give it even the smallest portion of their confidence in the doubtful discriminations that they are sometimes compelled to make. It is not to be doubted that the sound is produced by the rush of blood in vessels, and in my opinion, sustained by very long practice in obstetric auscultation, it depends upon the motion of blood in the iliacs and hypogastrics. I have certainly heard the same sound after delivery as before the child was born; and I have heard it, as dependent upon pressure by tumors within the abdomen. Hence I have not the least confidence in it as a means in obstetric auscultation. The sounds of the fœtal heart need never be mistaken. They can be detected at the fourth month, when the opportunity is good. M. Depaul has heard them much earlier. To look for them earlier than the fourth month is, however, in general, merely to lose one's time and find a disappointment.

It is perhaps, on some accounts, of less consequence to be able to ascertain the existence of pregnancy in the married than in the unmarried woman. The lapse of twenty weeks, and sometimes of sixteen weeks, makes it surely known; and the married woman, who has no motive to keep it a profound and important secret, readily imparts a knowledge of her situation, or her suspicions relative thereto, to the physician, or her friends. Not so with the unmarried female, whose reputation depends upon the concealment of her misfortune or crime. I have frequently been sorely embarrassed by uncertainty as to the condition of a patient whose ruddy cheeks and *embonpoint* seemed quite incompatible with a suppression of the catamenia, and whose complaints of aches and pains might possibly be merely assumed as a means of deceiving the medical adviser. Physicians are frequently applied to by the unfortunate or guilty for relief from "*obstructions*," when the applicant has only a design to obtain some powerful deobstruent or emmenagogue, which may serve to procure an abortion, that she knows no honest or respectable medical practitioner could be induced to procure for any pecuniary reward whatever. I hold it, therefore, to be a duty, in all cases, or ranks, to compare the complaints of amenorrhœa with the appearance of the patient, and if some evident malady does not accompany the supposed suppression, to withhold all medical aid, until time or necessity disclose the indications that are to be fulfilled. In physic, nothing should be taken for granted. It is too much to expect that a female, who has it at heart to conceal her pregnancy, will confess it to a medical man. Experience teaches us the very contrary.

CASE.—I was requested some time since by a lady to visit a favorite servant, whose situation excited her apprehension, as she had failed to menstruate for the antecedent seven months, and was already considerably swollen with something like dropsy. Being directed to the young person's apartment, I found her in bed, covered up to the throat with bed-clothes, but the face that peeped out from above them actually shone with ruddy health, or agitation, or both. The pulse was natural, the tongue clean, the respiration normal, and the entire physiognomical expression as healthful as possible. She informed me that she had a stoppage of the courses for the last seven months, and felt very bad, and was now alarmed at a swelling of the stomach, which had increased greatly of late. Suspecting that she had an important secret, I asked some questions about pains in the stomach, and, upon permission obtained, placed my hand on the abdomen, being almost certain that I should feel the motions of a fœtus; but, however long I held my hand on the abdomen, no movement of the child could be felt; so that, although I was certain she was pregnant, I was as yet unprepared to tell her so. I at length got permission to apply the ear against the side of the abdomen, and distinctly heard the placental souffle, and afterwards the stroke of the fœtal heart. Upon this assurance, I told her she was pregnant. "If I am," she replied, "I wish God may strike me dead!" and continued, with much temper and even passion, to declare that I maligned her and slandered her. I was obliged to leave her without the least assent, on her part, to my diagnosis, although she knew perfectly well that I spoke only a truth with which she had been long acquainted. She went out of town, and was confined in the country with a fine boy. Many examples of similar perverseness, in denying pregnancy, the signs of which were perfectly plain to me, and ought to have been obvious to the most careless observer, have fallen under my notice; so that I deem it a solemn duty, previously to the exhibition of any medicines, to ascertain that some signs of disordered health are present, in order that I may not commit the unpardonable fault of provoking an abortion, instead of removing a morbid obstruction of the catamenia.

Let me, however, warn the young beginner here, to take special care, in his diagnosis, that he shall first know the woman to be pregnant before he darè venture to say so. How could a gentleman commit a more unpardonable, or more insulting error?

I might here abstain from any further enumeration of the signs of pregnancy; for I am accustomed myself to decline giving an opinion in any case, until I am sure that I cannot be mistaken, which I never can be when I can hear the fœtal heart, clearly and distinctly repeating its beats in the womb.

Quickening is not a sign to be depended on by the medical attendant, though it may convince the patient herself; for the woman may perceive it, when the physician cannot. Her convincement ought not to be equivalent to his own convincement. Even the sensible motions felt upon palpation of the abdomen may deceive both the woman and the doctor. Multitudes of such deceptive cases of "*danse de la matrice*" are met with in a long career of practice. I have seen a woman who had the sensible motions of a child in her belly, though she had given birth to a fœtus at full term only six weeks before, and of whom several physicians who examined her had declared the motions to be caused by a child, yet her cervix uteri was an inch long in the vagina, and the abdomen so soft as to allow one to push his hand down so far as to feel the spinal column. She was not and could not be pregnant.

Many of my patients have engaged their monthly nurses and called me in, who, when I arrived, were found to be troubled with tympanitis only. *Tenues in auras evadit.*—See certain cases in my *Letters to the Class*, under the article Tympanitis.

The toothache, the ephelis, the hordeolum, nausea, salivation, pica, pouting of the navel, and even milk in the breast, are merely inferential signs, and are by no means to be depended on. I repeat, that I can rely only on the heart's motion heard in auscultation, and that sign cannot be detected until the fourth month. This is the rule; the exceptions, few in number, are those in which it has been found in the pregnant woman as early as three months and ten days, as in the instance now to be related. Depaul, *Traité Théorique et Pratique d'Auscultation Médicale*, p. 248, gives us the following relation.

CASE.—"Madame T——, who has already borne several children, had her courses on the 10th to 15th April. From the 17th to the 20th of same month, she cohabited with her husband; he then left Paris on a journey of a fortnight. Upon his return early in May, he found his lady confined to bed with the early symptoms of a typhoid fever, which in a few days became perfectly well marked, and continued twenty-four or twenty-five days. Her convalescence required a lapse of time nearly as long; and no sexual relation occurred until after her recovery. Nevertheless, upon the first of August following, as her courses had not reappeared, I was requested to see her with a view to determine whether this retention, which was very naturally attributed to the severe disease she had lately suffered, might require the employment of certain remedies for its cure. I confess that I was at first inclined to give up the idea of a pregnancy, begun antecedent to the commencement of the typhoid fever. I was little inclined to suppose its existence, computing it from the new sexual relations succeeding her convalescence; but the examination per vaginam, enabling me to detect a notable development of the volume of the uterus, I fell back upon the first opinion, of the propriety of which I became fully convinced, when, after having applied the stethoscope at various times upon the inferior region of the abdomen, I discovered the double pulsations, which were repeated 140 times a minute, while the pulse of the mother was only seventy-six. I could not hear the *souffle uterin*. Her confinement occurred in the following January."

M. Depaul, if the above case is to be relied on, heard the double sounds 100 days, or three months and ten days after the fecundation had taken place. The pregnancy continued 174 days after the audition of these fœtal sounds.

Probably few such early detections will be made by all the readers of this paragraph.

Inasmuch as I have spoken at length on the signs of pregnancy in my *Letters*, I shall beg to refer the Student, for further information, to that volume *sub voce*.

PART III.

THE THERAPEUTICS AND SURGERY OF MIDWIFERY.

CHAPTER IX.

LABOR.

In coming now to this third division of his subject, or Midwifery proper, the Student ought to understand that the practice of this art is one requiring not only a large amount of obstetrical or scientific information, but also a great deal of prudence and delicacy, as well as knowledge of the world; without which he will scarcely attain to any considerable eminence or happiness in the practice of it. Even the foregoing imperfect statement of the Anatomy and Physiology of Midwifery, subjects which, to be well described, would require several volumes rather than a few short chapters in this one, might serve sufficiently to show him, that a great variety of considerations must precede the study of Midwifery proper; and that those considerations relate not only to the structure and functions of the living body, but also to every step in the development of that body, from the earliest dawn of its existence, up to the complete maturity of its powers and faculties.

Such studies as these are in the highest range of philosophical contemplations. While they belong, perhaps strictly, to the domain of Natural History, they can never be disconnected from a pure Metaphysics, since the laws of life and those of mind are not clearly to be discriminated by the physiologist; for there is a real will of the flesh, *ελημα 7ου σαςκοσ*, as well as a will of the spirit of man. Again, so delicate and difficult, in point of conduct and conversation, are the duties of the accoucheur, that there is nothing short of absolute good sense, prudence, and tact can carry a man without reproach or misfortune through a long career of such a business.

There have not been wanting very good writers to show that the hole of this study and practice ought to be confined to persons of the nder sex; asserting that the relations of the sexes ought not to war- nt those familiarities that are inseparable from the practice, by men, the Art of Midwifery; and, in the world, at the present day, though is admitted that the Surgeon-accoucheur is an indispensable person society, he is by many looked upon with a sort of doubt and dis- ust, on account of the very peculiar nature of his pursuits.

On this question, however, I think any man's mind may arrive at a tisfactory conclusion, if it be only considered that a person with a re heart and righteous purposes, may be safely confided in, as far as lates to the morals of the profession of an obstetrician; and I will add at the objectors to the practice of Obstetrics by males, are perhaps more impure minds than the accoucheur himself: who, if he be tuated by the laudable motives that ought to rule the life and con- rsation of every medical man, may retort upon his opponent *honi it qui mal y pense*, or evil is he who evil thinks.

It ought to be evident to the intelligent and ingenuous Student, that me fit preparation of the mind to the discipline of this Art is required an introduction to the exercise of it; since, to go at once from the llege, and without reflection, into the very delicate positions in hich he is about to be placed, shows, to say the least, a great want of udence and forethought. Many clever men have made shipwreck their hopes by the want of a little reflection as to the course they ould pursue; or by early abandoning themselves to professional bits, which, without the least intention on their part, have gradually sumed a tone of familiarity, that has been construed into imperti- nce, or downright insult.

In my opinion, no woman can be placed in a sanitary condition mpelling her to appeal to the aid of the accoucheur, without some nse of a mortified delicacy. If this be true, it is quite clear that the ly reparation for, or the only means of obviating this unpleasing pression, consists in the exhibition to her-wards, of the most pro- und respect and sympathy, and that, too, proffered with a sincere nviction of the painful nature of her position, as well as the indis- nsable propriety and necessity of submission to it.

A female possessed of ordinary sensibility will be less affected by e sacrifice of feeling she is thus compelled to make, if she be treated an object of respectful consideration, than if approached with a ght and indifferent address; and while she finds her own pride less ounded, will be both more confiding in the wisdom of her physician, and grateful for his counsel or service, as well as respectful to and considerate of his calling and profession.

The occurrences that befall in the course of an accoucheur's professional life are many times of a nature to require at his hands secrecy, and good faith; for he cannot but become the depositary of many informations, in which are involved the reputation and even honor of persons, and the safety of most important private interests.

Let the Student, then, before he goes any farther, make his mind firm in the resolution to guard with good faith those secrets with which he may become acquainted as physician, or Surgeon-accoucheur. He ought beforehand to consider the meaning of the term professional secrets, and know that they are either accidental revelations, or confidences due to his station as physician, and not to himself as person; for, of the vast number of those which may be hereafter communicated to him, or discovered by him, not a tithe or a hundredth part of them would ever be his, but for his professional position. If a man, therefore, is dishonored, who reveals a secret communicated by a friend, how far more base is he who takes advantage of his professional standing to make public circumstances that have been intrusted, so to speak, not to himself alone, but to the sacred character of the Iatrist.

It is not in regard to grave and serious matters only that he is called upon to be silent, prudently abstaining from acquiring for himself and his brethren the unenviable character of the babbler; even the most inconsiderable circumstances as to the sick are confidences that ought not to be disappointed and betrayed. This is a just and true remark, and it is a rule that ought to be followed in all circumstances and ages.

The Caliph Al-Mamun, as we are informed by Abul-Pharajïus, in his History of the Dynasties, was a friend of science, and exhibited his patronage, by fostering many learned men, among whom were some of our own profession. Among others of his numerous medical favorites, was John Ocularius, whose duty it was to visit the Commander of the Faithful every day, and that in his most private apartment, alone.

The caliph gave him great honor, and for his services allowed him a monthly stipend of a thousand gold sequins.

Upon one occasion, as the physician came out of his master's apartment, while passing through an anteroom, he was asked by one of the servants, "What is the caliph doing?" "He is sleeping," was the incautious reply. Unhappily for the Doctor, this reply was overheard by the successor of Mohammed, whereupon the culprit was sent for, and brought before the chief of Islam. "What!" said he to the offender, "have I employed you as my physician, and admitted you to my intimacy, in order that you should report to my servants as to my private occupations? Go out of my house."

The poor medico, in telling this story, to account for his fall, added that the caliph never afterwards would admit him into his presence; which was but the just punishment of a professional indiscretion. Let the Student reflect upon the punishment deserved by those who babble the concerns of families or individuals. John Ocularius was turned out of the court of Al-Mamun for merely saying that his master was asleep! suppose the young doctor should say, my "mistress has a sore leg!"

But, in addition to the quality of discreetness above insisted upon, the Student should firmly resolve to merit the appellation of Scholar—a title far more honorable than that of mere knight, nobleman, or minister of state.

It is to the Scholar that the world is indebted for its preservation from its own violence and vices. It is to the Scholar that it is indebted for good laws, for science, and for all the arts. The Scholar is the promoter of virtue, and decency, and good conduct, both by his precept and his example; for it is to him that mankind turn their eyes to see what is wisdom, what is virtue, and what is true liberty. All those who are not, by education, brought out of the bondage of ignorance, are slaves indeed; slaves of lust, superstition, and ignorance. Hence it is evident that the Scholar is the only real nobleman, and his nobility becomes more and more exalted in the ratio of his elevation in virtue and knowledge, towards the fountain and source of all knowledge and all virtue. Let him aim, therefore, to become a Scholar indeed, not only that he may embellish his understanding with every ornament of learning, but that he may become able also to minister to those who may be committed to his care, *tost, seurement, et sans douleur*, as old Fournier says in his *Accoucheur Méthodique.*

The Student ought not to rest satisfied with the bare intention to make himself equal, in skill and dexterity, to the common midwives of the country. He ought to be resolved to become fully acquainted with the dynamics of the generation-sphere; by the irregular operation of which, as Wigand says, the power of the uterus in labors is so often baffled, and its energies *misdirected.* If he studies well the therapeutics of midwifery, and practices them well, there will be no occasion to twit him with the reproach so commonly cast on the accoucheur, that when he is called in, "one or the other, mother or child, goes to the grave," to use the words of Wigand, which I cannot but quote in this place.

"Gibt es keine gegend, keine stadt mehr, wo das Publikum es nicht anders weiss und gewohnt ist als dass, wo ein accoucheur sein hand anlegt, wenigstens eins von beiden, das Kind oder die Mütter darauf gehen müsse? Kennen, wir jetzt keine Geburtshelfer mehr, die, wo sie hinzugerufen werden, keine andere Indication zu machen im Stande sind, als augenblicklich mit Zange oder Faust, über den unschuldigen Uterus herzufallen, und ihn, wie einem Dieb und Spitzbuben der das Kind gestohlen hat, zu mishandeln?" "Are there not any districts or cities to be found, in which the public generally suppose that, where a physician is called in, one of the two, mother or child, must be sacrificed?—and are there no accoucheurs at the present day, who, being called to a case of labor, can discover no other indication of treatment than that of instantly, with fists or tongs, falling upon the innocent womb, to abuse and maltreat it as a thief, or robber that has stolen the child?"

These words of Wigand are strong words; let them sink deep into the heart of the Student, for they are from the lips of as true and noble a Scholar as has in any age graced the annals of Medicine. Let the Student also enter upon his pursuit with a good resolution to add something to the value of the art he is about to practice during his future life; let him leave to the brethren, and to the world, some fruit or fruits of his observation, his reflections, or his experience. He is about to enter upon a life singularly arduous and toilsome, involving sudden and most painful responsibilities to individuals, and to society at large. He is doomed to sacrifice himself for his station. There are no vacations or holidays for him; and night itself is turned into day; for his occupations cease not with the setting sun; his task is never done. More labors occur at night than during the day; a circumstance that adds greatly to the onerous and distressing duties of the Accoucheur. M. Quételet, of Brussels, in his treatise *Sur l'Homme et le Développement de ses Facultés*, &c., t. i. p. 108, says that, being led by curiosity to inquire whether there is any connection between the hours of the day and the number of births, he employed in his calculations certain results communicated to him by Dr. Guiette, who was then attached to the Maternity Hospital St. Pierre, at Brussels. They were collected during eleven years, from 1811 to 1822. M. Quételet communicated them to M. Villermé, who found them perfectly analogous to results obtained at the Hospital de la Maternité, at Paris.

In making out his tables, M. Quételet adds a column showing the number of the still-born children, and a third column indicating the results obtained by M. Guiette in 1827 and 1828.

Hours.	Births. 1811–1822.	Still-born. 1811–1822.	Births. 1827, 1828.
After midnight	798	53	145
Before noon	614	51	119
After noon	574	59	119
Before midnight	694	55	148
Total	2680	218	531

"These results show that births are more numerous at night than during the day; the ratio for the eleven years from 1811 to 1822, is 1492 to 1188, or 1.26 to 1; and for the two years' results of Dr. Guiette, 1827, 1828, the ratio is 293 to 238, or 1.23 to 1: hence, there are born at night almost exactly five children for four born during the day."

Dr. Buck, of Hamburg, came to nearly similar results. M. Quételet sets up the following table of them:—

Births.	Winter.	Spring.	Summer.	Autumn.	Mean.
After midnight	325	320	291	312	312
Before noon	270	252	256	216	249
After noon	190	136	189	235	183
Before midnight	215	292	264	247	256

These figures give the ratio of 1.31 to 1 for the night and the day. Particular observation shows, that at about the hours of noon, and midnight, the births are least numerous. Notwithstanding the ratio of night to day births is as above stated, it will happen, that of those referred to as day births, a very large number will require the counsel of the physician during the night, since many labors require from twelve to twenty-four hours for their completion. It is true, therefore, that his task is a severe one. With these remarks, I now proceed to treat of Midwifery, which is the art of assisting women in labor.

Labor is the process by which the contents of the gravid womb are expelled; and the word is highly expressive of the fatiguing, violent, and painful struggles and efforts of the woman to overcome the obstacles to her deliverance from the uterine burden.

Labor should commence, as we have already seen, at or about the two hundred and eightieth day from the last show of the menses, or the one hundred and fortieth day after quickening; and it may, in general, be expected to terminate without any artificial power or assistance, after a few hours of travail—the time being greater or less, according to the amount of the power employed, or the resistance to be overcome. The average duration of labor has been stated at four hours: I should think it greater. There are many examples of women in labor who are completely delivered in ten minutes from the first perception of the signs of parturition: very numerous cases occur in which labor is protracted during twenty-four hours; while some of the patients are occupied three, four, and even five days, with continuous efforts to bring the child into the world. I have witnessed one labor of nine days' duration, and many of from three to five days.

The essential element of labor is the contraction of the muscular fibres of the womb, the end or object of which is the evacuation of the uterine cavity, so that, the whole of its contents being ejected, it may return again to the non-gravid state, when it will measure from two and a half to three inches in length, about an inch and a half in width, and half an inch or three-quarters of an inch in thickness; the organ being, before the commencement of the contractions, about twelve inches long by seven or eight inches in transverse diameter.

As the os uteri is closed during pregnancy, it follows that the expulsion of the contents of the organ cannot take place until the orifice becomes sufficiently opened to permit the child to pass out; and that there is also required a sufficient dilatation of the vagina, and of the vulva; in all which parts a greater or less degree of resistance or obstacle is found; which, taken in connection with the resistance afforded by the bony structures and the perineum, are generally the causes of a delay of several hours in the birth of the child, even where it presents itself most favorably to the openings through which it is destined to effect its exit.

In a vast majority of cases, the powers of the womb alone are insufficient to effect the delivery of the child; and its birth is considerably aided by the efforts of the abdominal muscles, and the diaphragm, which are not only capable of making a direct expulsive effort, but, by presenting a *point d'appui* for the contracting womb, can assist it more efficiently to exert its own peculiar forces. The abdominal muscles and the diaphragm, acting alone, can push the point of the womb down low into the excavation, and hold or fix it there, while the fundus and body of the organ are propelling the ovum against the obstacles that stand in the way of its escape. Hence, although the essential element of labor consists in the uterine contractions, there are collateral dynamic elements of the process that greatly avail in its completion, and that ought always to be well understood, in order that they may be either called into action, or restrained, as the obstetrician may please to direct. Perhaps the best idea of the dilating pains of labor is, that the presenting part of the child is pressed against the

the os uteri, which, by the contraction of the body and fundus, upwards over it, so as to strip the womb up over its head, its d its legs, until the whole is expelled from the cavity of the

e **of Labor.**—The cause of labor, or, I should rather say, the the onset of labor, is not well understood, although it is quite e that it is to be found only in the inability of the neck of the n any given case, to bear further distension. In the begin- pregnancy, the ovum inhabits and distends only the corpus dus of the womb. As the child increases in size, it requires a idus than these parts can afford, so that the upper end of the now becomes distended. Gradually, the whole of the neck is to form the oviform nidus for the full-grown ovum. The os ll remains unexpanded; when the ovum has become too large to thin the completely developed uterus, even the circle of the os n no longer resist the distending pressure. It begins to yield; a little, and at length, its antagonism to the expulsive powers feebler and feebler, it is fully dilated. The whole cervix is me a wide cylinder, through which the child is thrust by the ions, which tend to approximate the fundus to the os uteri. This Labor begins from a necessity of the uterine constitution, and n any ascertained degree of development of the child, which, large or small, is most likely to be born two hundred and lays after the last catamenial period of the mother; but may born until three hundred, or even more days have elapsed. e of the child is not found to bear a proportion to the excess of ation of the pregnancy. It does, in fact, frequently occur, womb begins its contractile effort long before the expiration two hundred and eighty days; or, on the other hand, it fails to ce its contraction for several days after the two hundred and have elapsed; but, whenever it does begin, it is because it will f no further or longer-continued distension; or because the nd os will no longer prevent the ovum from escaping, which it tends to do when they cannot prevent it.

is the theory by which Baudelocque endeavors to account for which I have above explained. It seems clear that there is a or antagonization betwixt the fibres of the cervix and those of dus and body of the womb going on throughout every stage of gnancy; that, in the early months of pregnancy, the fibres of ly and fundus yield to, while those of the cervix resist the distending force, until about the seventh month, at which time they also begin to yield, and continue to yield until the end of the ninth month. These fibres of the cervix are the seats of a retentive, while those of the fundus and body are the seats of a contentive and expulsive faculty or power. At the ninth month they are balanced, or antagonize each other exactly. At length, the development of the ovum going on, those of the fundus become the more powerful, and those of the cervix and os uteri are loosened, and finally so completely opened as to allow the ovum to escape. The same force which converted the cylindrical into the conoidal cervix continues to operate until it has converted the conoidal neck into the wide cylinder whose diameter is at least 3.8 inches. When this change is once effected, the fœtus comes forth into the vagina and then into life. This explanation is, perhaps, as good as any that could be offered; it is perhaps not unworthy of remark, that, in the development of the gravid uterus and its contents, we behold a wonderful adaptation of parts to the purposes they are destined to fulfil; since the growth of the child would, if continued indefinitely, make its delivery impossible, and therefore the Author of nature has, by a simple law, provided against such a fatal contingency; the womb, by that law, refusing to yield any further than is sufficient to allow the child to acquire a certain degree of magnitude and vigor, essential for its respiratory life, but not too considerable to prevent its birth from taking place; and this perhaps is, after all, a sufficient solution of the problem.

Subsidence of the Womb.—The term of utero-gestation and the commencement of labor may be supposed, as has before been said, to be fixed, and rendered necessary in part, by the great distension of the abdominal muscles, and intolerable pressure upon and displacement of the parts contained within the abdomen. I know not what influence on the production or first excitement of labor contractions may be exercised by the altered state of the abdominal muscles themselves; but it is, perhaps, not too much to infer that they do at length exert some considerable share of influence, by their constant or tonic contractile operation, in aiding the fundus and body to overcome the retentive effort of the os uteri, any yielding or relaxation of which tends to invite or provoke the contractile effort of the fundus. We see, at least, that, in the last days of pregnancy, the womb settles down with its apex in the Excavation, and the woman seems much smaller than she was before this sinking downwards of the uterine globe was perceived. Now, it may be asked what can cause this settling or sinking downwards of the romb, if it be not the action of the abdominal muscles and diaphragm, hich have pushed it downwards. Labor pains are caused by the conractions of the womb, and are first situated in the neck of the organ: ut it happens that when the womb is much sunken, it in one case eels very hard and firm, as if its fibres were in a state of contraction r condensation; whereas in another case it is soft and flaccid, notwithanding it may be very much depressed into the excavation; no sign f actual labor being present in either example. The sinking downards of the womb takes place, in some persons, several days before he first pains are felt. In such instances, the womb must be regarded s wholly passive in the matter; it is forced down by the muscles, and ot by any intrinsic action or power of its own.

This is called the subsidence of the womb before labor comes on, and is a sign of the approach of that crisis, which monthly nurses and exerienced women are acquainted with—and which it is proper that the tudent should also be able to appreciate.

Discharges from the Genitalia.—As labor approaches, the secreions of the vagina and os uteri become augmented. They grow more iscid, and are often of a pink or even red color. In some cases there a clear *show* of blood. The labia externa seem to be swollen or suculent with the increased circulation in their capillaries, and the mucous ning of the vulva retains its moistness notwithstanding the augmented ascular activity. They do not become harder, but on the contrary ofter and more ductile; which prepares them well to yield to the istending force by which they are soon to open a way for the transit f the child.

Labor Pains.—The contractions of the womb take place at intervals hich are longer at the beginning, and shorter as the labor advances. hey last from fifteen to thirty or forty seconds, and, on many occasions, ven longer. The intervals, at first, are from twelve to thirty minutes; ut as the irritation becomes more intense, the pains are repeated every ve, three, and two minutes, and even every minute; increasing in vioence and duration until the organ is freed from its load.

As to the duration and number of the pains, I said a little while ago hat the average duration of a labor has been stated to be four hours. f this computation is a correct one, then it may be said that in the first our the woman shall have a pain every twelve minutes, which would ive five pains for the first hour. If she should in the second hour have pain every six minutes, she would have ten pains in the second hour;

pains every five minutes of the third hour would amount to twelve pains; and if she should be affected with them every three minutes during the fourth and last hour, she would suffer the pains twenty times in that period. So that twenty, twelve, ten, and five pains would make up the sum of forty-seven pains for the labor. The whole duration of the whole of the labor pains, supposing each one to last only forty seconds, would under this computation be about fifteen minutes; so that, in a labor of four hours, the woman would be thirty minutes under labor-throes and three hours and a half without them. It is to be understood, however, that much pain and distress may be sometimes experienced notwithstanding the womb is not actually contracting, or during the intervals; though, generally speaking, the woman is comfortable except when under the power of the *pains*.

This calculation refers, therefore, only to the state a woman is in when under the influence of a labor pain, and not to the other causes of distress, from pressure, distension, and the disparting of the textures in the pelvis.

There is a very singular passage in Saccombe's "*Elémens de la Science des Accouchemens*," p. 202. I was much tempted to translate the whole story as he relates it, not only as a case excellently calculated to give instruction to the young, but quite as much so to show forth the impudence and audacity of that singular and talented author. The case in question is the history of a labor which he had charge of, and which he observed, from beginning to end, without in the least interfering with the operations of nature. He was alone in the chamber with the young woman. "En cet état des choses, je me suis en embuscade, l'œil au guet, et bien resolu d'abandonner entièrement la patiente à la nature, comme si elle eut été sueule au sein d'un bois. La, le compas dans l'œil, la montre d'une main et le crayon de l'autre, voici le spectacle vraiment ravissant dont je fus temoins." M. Saccombe goes on to say that, from ten o'clock exactly, to eleven A. M., the woman in labor had seven pains, which became greater and greater in succession, and followed each other in the order here expressed.

				Interval of	Duration of pain.
From the	1st	to the	2d pain.	15 minutes	21 seconds.
"	2d	"	3d	14 "	27 "
"	3d	"	4th	10 "	27 "
"	4th	"	5th	8 "	29 "
"	5th	"	6th	7 "	32 "
"	6th	"	7th	6 "	35 "

rom eleven to twelve o'clock she had twelve pains, increasing pro-sively and recurring as follows :—

rom the 7th	to the 8th pain.	6 minutes	36 seconds.
" 8th	" 9th	6 "	40 "
" 9th	" 10th	6 "	42 "
" 10th	" 11th	5 "	45 "
" 11th	" 12th	5 "	45 "
" 12th	" 13th	5 "	47 "
" 13th	" 14th	5 "	49 "
" 14th	" 15th	5 "	55 "
" 15th	" 16th	4 "	62 "
" 16th	" 17th	4 "	70 "
" 17th	" 18th	4 "	87 "
" 18th	" 19th	4 "	93 "

s the clock struck twelve, the waters of the amnios gushed forth, as he says, "*me baignèrent de la tête aux pieds.*" At the 20th , the head passed the inferior strait. With the 21st pain the head born. After a rest of five minutes, the 22d pain carried the right lder to the sacrum and the left to the pubis, and the 23d pain lled the child; five minutes after which the placenta was thrust h from the organs.

he pain felt in labor is owing to the sensibility of the resisting, not to that of the expelling organs. Thus the sharp, agonizing, dispiriting pains of the commencement of the process, which are d grinders, or grinding pains, are surely caused by the stretching he parts that compose the cervix and os uteri and upper end of the na. Pains are rarely felt in the fundus and body of the organ; nineteen out of twenty women, if asked where the pain is, will y that it is at the lower part of the abdomen, and in the back—cating, with their hands, a situation corresponding to the brim of pelvis, and not higher than that—a point opposite to the plane of os uteri.

hen the pains of dilatation are completed, and the fœtal presenta- begins to press open the lower part of the vagina, the pain will, ourse, be felt there, and is finally referred to the lower end of the um, the sacral region and perineum. The last pains, which push out perineum and put the labia on the stretch, will of course be felt in e parts chiefly. The sensation, under these circumstances, is represented as absolutely indescribable, and certainly as comparable to no other pain.

The effect of the pains on the bladder and rectum might easily be foreseen; but, even where they fail to excite the sympathetic action of those parts, the descent of the fœtal head, which sometimes fills up the pelvic canal as a cylinder is filled by its piston, must cause the evacuation of the entire contents of the lower rectum and bladder of urine.

The effects produced by the pains and efforts of labor upon the constitution are very striking. The mind of the woman is in the beginning anxious, irritable, fearful, and full of the most gloomy anticipations; but as the process goes on, and the expulsive efforts become more and more violent, it acquires courage and firmness and the most dogged resolution: the patient seems like one who has a task set for her, which she is resolved to execute as rapidly as possible; and she therefore bears the great pains of expulsion far more submissively, or rather courageously, than the small or dilating pains.

The actions of the woman indicate pretty clearly to the practised eye, the state of advancement of the process. Antecedently to the exit of the head from the os uteri, or its deep insertion into that circle, the voluntary efforts of the patient are confined to a violent grasping of things with her hands. She generally seizes the hand of a bystander, and squeezes it violently, or endeavors to twist or wring it, not *pull* it. Such an action always indicates a grinder, or a pain of dilatation; but when an expulsive effort takes place, she not only grasps with all her force, but she pulls at anything in her reach; so that an experienced accoucheur generally can decide, upon entering the chamber during a pain, that the dilatation is or is not completed, by observing whether the patient merely squeezes or presses the hands of her assistants, or, on the other hand, whether she pulls them with great violence.

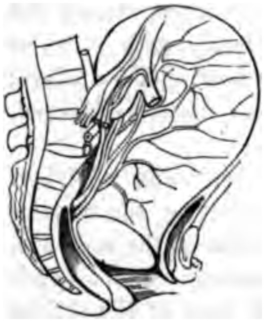
The low position or situation of the presentation at length institutes a tenesmus or bearing-down sensation, which is a desire to thrust with all the forces of the abdominal muscles, whatever exists within the pelvis, beyond the limits of the body. Tenesmus is, in the beginning, controllable by the will, but when it has become exaggerated by the presence of the presenting part in the ostium vaginæ, it does happen that no exhortation or fear is capable of inducing the woman to refrain from making the tenesmic effort, in certain cases. Sometimes, however, the patient may be aroused from the all-absorbing tenesmic sense, and made to heed the urgent appeals of the surgeon to desist from fforts that endanger her. The urine and stool are generally expelled retty soon after the commencement of the tenesmic pains of labor. ut in some patients, the first signs of labor coincide with a disposiion to go on the close stool.

In addition to the signs derived from the woman's voluntary actions, he practitioner can frequently decide upon the degree of forwardness f the labor, by attending to the nature of his patient's expressions nd moans, and to her respiration. In the early stages during the ilating pains, she either gives out her breath freely, with voice, or erely holds it, making use of no straining or bearing-down effort; nd even if she be here requested to strain or bear down, as at stool, he will resist, or cannot obey, the injunction.

Women cannot bear down, at the very beginning of labor. earing-down means an effort to expel by contracting the muscles f the belly; but when the womb is full, its fundus at the scrobicle, nd its os at the plane of the strait, the recti muscles cannot expel, hey can only hold or compress it: the same is true of the oblique nd transversalis muscles. When, however, the fundus has descended w in the abdomen, having followed the os uteri which has by this ime been pressed down to the bottom of the excavation, then the abdoinal muscles can exert a vast expulsive energy. So that, when the s uteri is nearly or quite opened, and the real expulsive pains opeate, the woman not only holds her breath, but she makes use of the uscles of respiration to fix the thorax firmly, and then, in the most orcible manner, contracts the muscles of the abdomen upon the womb. f she be now enjoined to desist from bearing down, and fails to obey he injunction, it is because the tenesmus of labor, like that of dysenery, is irrepressible. The muscles that she employs in bearing down, fter she has fixed the diaphragm and other muscles belonging to espiration, are the rectus abdominis, the external and internal obliqui, nd the transversalis. Is it not clear that, while the fundus uteri is igh up in the abdomen, the violent contraction of these muscles would ave little effect in forcing the uterus downwards, but would rather ompress the womb against the back part of the abdomen; while, on he other hand, when the uterine globe has sunk low down in the belly, he operation of these abdominal muscles, as agents of expulsion, must ecome very great and cogent? I have ever found it useless to urge a oman to bear down upon a grinding pain, and always feel it incumbent upon me to cause the nurses and bystanders to desist from exhorting the patient to bear down in the early stages of labor; an exhortation which they very kindly, but very untimely, never fail to make.

Such voluntary efforts cannot be beneficial in their influence on the labor, but they may become pernicious, in certain circumstances, where they not only tend to disorder the sanguine circulation, but very much and very early help to exhaust the strength.

Fig. 80.



I have placed here a cut, Fig. 80, which shows the state to which the cervix uteri must arrive before the full efficacy of the true expulsive, or bearing-down pains can become manifest. This is a cross section of the pelvis, with the womb and a part of the already dilated vagina. It seems that the cervix uteri has become almost cylindrical, from being a cone, as it was before labor began. The bag of waters is seen bulging out from the fully dilated orifice. The waters are nearly ready to give way—and, in fact, there are many labors in which, as soon as the crevasse in the membranes takes place, the child's head rushes rapidly through the orifice and descends to the very bottom of the excavation, or is even expelled by the same single pain.

Constitutional Effects of the Pains.—Even leaving out of the question the exciting effects of the pangs and agonies of travail, we should naturally expect that the muscular exertions of the parturient subject would, as in violent exercise, greatly accelerate the circulation of the blood, and augment its momentum; and we accordingly find the pulse to become more and more elevated as the efforts prove to be greater and greater. The heart beats with increased violence, and the pulsations amount to one hundred and upwards in the minute; even one hundred and twenty beats are not uncommon. The respiration becomes hurried in proportion, and of course the heat of the body tends to be developed *pari passû* with the augmentation of the circulation and respiration; so that fever would soon become intense, were it not that the most profuse diaphoresis, chiefly from the upper part of the body and head, comes on to prevent the occurrence of what would, otherwise, become a dangerous fever, and in a few instances does become so. I have already taken occasion to remark upon this excited state of the vascular system, that it is not to be deprecated except in those instances in which it goes beyond the just bounds. It is, however, always worthy of close observation, in order that its tendency to excess may be checked, by a free use of cooling drinks; by ventilation; by lighten-

e bed-clothes; by making the patient comfortable in her bed—
ding her anxiety of mind, by assurances of care and protection,
noving wet sheets and heated pillows; by an enema or purge;
astly and chiefly, by the use of the lancet.

state of the mind is worthy of a large share of the Accoucheur's
l. The most cheering and satisfactory assurances that the state
ospects of the labor will admit of, should be given, with a due
ance of the truth. A woman will be more comforted and com-
by being made certain that she shall be delivered in six hours,
y a promise which she does not fully believe, that half an hour
shall put a period to her anguish. No promises should be
that may not be implicitly relied upon by the physician himself,
l as by the patient. One of the golden verses of Pythagoras
ισβου οςκον—Keep thy troth.

ward Signs of Labor.—The signs of labor are those which we
from simply observing the woman's manner, and from hearing
n account of her symptoms; or they are such as we obtain from
uch, or examination *per vaginam.* For the most part the state-
of the patient herself, or that of her monthly nurse, is taken as
ficient early evidence, and we wait for a certain degree of mani-
ogress before we address ourselves in a more particular manner
blish the absolute diagnosis, which cannot be very certainly done
it the Touch.

l, there may be observed the subsidence of the abdominal swell-
ving to the sinking of the apex of the uterus into the excavation,
n some measure, to an increase of tonicity in the whole organ.

most of the cases, the new vital activity, set on foot, manifests
by augmented moisture of the genitalia, and especially by a
s mucus, that not a little resembles the white of eggs, which,
ver, is frequently stained with a little blood coming from the
ted capillaries about the cervix uteri. This tenacious mucus is
elded by the vagina, but always and only by the cervix.

increased tendency of the bladder of urine to expel its contents
arks the beginning of labors; and the rectum is favorably affected
the pelvic excitement prompts it to dejection of its contents.

sea and vomiting are frequently met with in the lying-in room,
ptoms of commencing labor; though it is true they mostly pre-
emselves when the os uteri is about one-third dilated.

lent and protracted tremors of the body and limbs, with clattering of the teeth, as in ague, are very generally observed, but they are unaccompanied with any chill or sense of coldness.

Finally, pain in the back and hypogastrium, lasting about twenty seconds, attended with hardening of the uterine globe, and recurring at regular equal intervals, is a sign much to be relied upon, though the vaginal taxis gives us the safest assurance by revealing the state of the os uteri.

In general, we are accustomed to note, by a watch, the length of the intervals betwixt the pains, and to form an opinion of their intensity, by the gestures or moans, or other complaint of the woman.

If the patient have reached her full term, we are free to announce, from these points of diagnosis, that labor is begun; and if, upon making examination *per vaginam*, we find the os uteri dilated ever so little, and the membranes rendered tense during the pains, we may be quite sure that the parturient process has commenced. The application also of the hand to the abdomen discovers during each pain a hardness and rigidity of the uterine globe that give place to a flaccid and yielding softness during the absence of the pain. Such are signs of the true pains of labor.

Touching or Examination.—If the patient's assent can be obtained, after the proper reasons for asking the privilege of making an examination *per vaginam* have been laid before her, we should have two principal objects in view, while performing that operation: one of these is, to note the presentation, and the other, the position. There are other observations to be made at the same opportunity, such as situation of the internal parts as to place, and the degree of softness or relaxation of them—their moisture or dryness—the state of the rectum, and the sensibility of the organs concerned in the parturient process, as natural or morbid.

Upon obtaining the patient's consent to the examination, she should be requested to lie on the bed upon her left side, with her hips near the foot of the bed—being placed about eighteen inches from the edge or end—and with the knees drawn upwards towards the abdomen, a small pillow having been previously placed betwixt them. Except upon occasions of the greatest emergency, a third person should always be present; and the physician ought to refuse to perform the operation of Touching, except in the presence of a third person, who ought to be some elderly individual, acting as nurse for the occasion.

Let the attendant provide a napkin, and a small quantity of pomaso as to let the knuckle pass in to the orifice first, after which it may be extended. This advice was inculcated by Saccombe. Paul Portal, at p. 3 of his *Pratique*, &c., says, you must proceed operation "commençant aux parties supérieures de ces levres, et ant le long du clitoris; l'on prendra soigneusement garde de blesethre qui se trouve située au dessous," &c. &c. This old author ot have given a worse advice in this matter, and I recommend student to follow my directions, and not his.

point of the finger be now carried along the posterior wall, the upper extremity of the vagina, the os uteri is felt, and its f dilatation ascertained. When the finger comes to the os uteri, ain still continues, let the greatest care be taken not to rupture rion or bag of waters, as it is called, especially in a first labor. membranes are extremely tense during the pain, which forces wn through the opening of the womb, forming the segment of e, of greater or less size, according to the greater or less degree ilatation: if they should be too rudely touched while in a state on, they might burst, and permit the liquor amnii to escape; vorable event in the early stage of labor, which it both retards ders more painful. There is no need for pressing against the waters during the pain, because, by waiting until the pain sube bag becomes relaxed, and can then be pushed back again he mouth of the womb, so as to enable the finger to touch the ation. For the most part, we only ascertain, in such an exan, the presentation, and being satisfied with that, we wait great dilatation or the discharge of the waters allows us to

During the operation of *Touching*, we also endeavor to learn the condition of the orifice of the womb, as to whether it is rigid and unyielding, or soft and dilatable; whether it be thick and dry, or thin and moist, with an abundant discharge of glairy phlegm. We also ascertain if the os uteri is in a favorable position, that is, in the middle of the pelvis, where it ought to be; or on one side; or high up behind, towards the sacrum; and we rectify its position, if need be, by changing the situation of the mother to her back, or to either side, according as we may judge most fitting to bring the mouth of the womb into its proper place. Thus, suppose the mouth of the womb inclined altogether to the right side of the pelvis, the patient being on her left side; let her turn on to her back, or quite over to her right side, and the axis of the womb will be brought more nearly to the middle line or axis of the pelvic canal. We are, also, in this operation, to form an opinion as to the probable resistance to be made by the vagina, perineum, and labia, so as to make up our prognosis, which it is best, however, to keep as a secret not to be divulged for the present.

At length, the pains having opened the os uteri to the greatest extent, (as in Fig. 80,) and driven down the bag or bladder of waters almost to the orifice, the membranes burst, and the fluid of the ovum escapes with a gush. As soon as practicable after the escape of the liquor amnii, the Touching should be repeated, and now there is little difficulty in determining the position of the presentation, though it may often be ascertained beforehand, through the unruptured membranes.

In general, that side of the pelvis in which the head can be felt at the lowest level, is the one to which the vertex points—for the vertex must dip, in order to enter the bony canal. But if, upon feeling the scalp with a finger firmly pressed upon it, a suture is discovered, which upon being traced, is found to meet with two other sutures, and only two, that point of meeting will be the posterior fontanel or vertex; and it will be in the first position if it be near the left acetabulum; in the second position if it be found near the right acetabulum; and in the third position if it be directly behind the symphysis of the pubis. But if, instead of three sutures, there be four, with a large membranous or soft space betwixt their points of union, it will be the anterior fontanel; and if it be near the left acetabulum, the head will be in the fourth position; in the fifth if it be to the right acetabulum, and in the sixth if it be near the pubis. Let not the Student forget that, when the head presents in a flexed attitude, it is a vertex presentation, no matter to what segment of the excavation it may happen to be addressed—nor that, in the three first vertex positions, the posterior or triangular fontanel is to be felt, while the quadrangular or anterior fontanel is met with in the three last—*videlicet*, the fourth, fifth, and sixth positions.

False Pains.—There are a sort of pains that afflict some women towards the end of pregnancy, which, however severe and unbearable they may be, are nevertheless very justly denominated *false pains*, to be discriminated only by Touching.

I have many times been kept out of my house all night, in order to be near a patient supposed to be in labor; and having been refused the privilege of making the examination until morning, after so tardy an admission of my request, I have found an os uteri perfectly closed, and a still tubulated or cylindrical cervix; so that I have been obliged to announce not only that the patient was not in labor, but that she had not yet reached the full term of pregnancy by ten days or a fortnight.

It is exceedingly vexatious thus to be baffled by the unreasonable backwardness of the patient to submit to an operation which she knows to be necessary and inevitable; but we shall, in all early stages of labor, except those where the water comes off at the very commencement, be liable to such disappointment and deception, until we verify our other inferences by the infallible test of Touching.

The similarity of these false pains to the true pains of labor is very great; there is even to be felt the hardening of the abdomen; but, if carefully appreciated, it will be found that the rigidity is occasioned by a contraction, not of the womb itself, but of the muscles of the belly, that are so constricted upon the uterine tumor as to make even the womb appear to be contracted; whereas it is actually only compressed by the abdominal muscles. False pains, then, are essentially involuntary contractions of the abdominal muscles. They are, probably, of the nature of tenesmus, and are caused either by the ventral irritation produced by the distended womb, or else by intestinal irritation from sordes, flatus, acidity, rheumatism, and other causes that would also suffice, in the non-gravid state, to bring on spasms of the abdominal muscles. The difference between those of the non-gravid and those of the gravid state is, that in the former they are paroxysmal, but in the latter they are regularly periodical; which latter character they acquire from some law of the uterine innervation that I am unable to explain.

False pains are, likewise, common symptoms of rheumatism of the womb. This rheumatic disorder is far more common than has generally been supposed; and, when misunderstood, is the fruitful source of anxiety and doubt to the practitioner, besides of insufferable distress which it occasions for the patient herself.

Wigand, *Geburt des Menschen*, band i. p. 82, says that although rheumatismus uteri is sometimes connected with rheumatic pains of other parts of the body, yet, for the most part, only the womb and organs of generation suffer on such occasions. The causes, he thinks, are to be found in the hyperæsthetic state of the gravid womb, its exposure to cold from its projecting condition, and carelessness as to dress during pregnancy.

The characteristic signs of the disorder in labors consist, according to Wigand, in a general painful sensibility of the womb to the touch, which is attended with contractions of the organ that are painful alike at the beginning, middle, and end of the labor-pain. The pain of a contraction in the rheumatic womb differs thus from that of a healthy uterus. In the latter, a normal pain gives no distress during the first half of the contraction (Wehen Cyklus), for the *pain* of a labor-pain does not commence until the mass of the organ begins to exert its superior power by thrusting the presentation into the dilating cervix uteri and vagina.

I have met with several instances of rheumatic gravid womb, where the woman was tormented with false pains for many days previous to the real attack of labor. In one delicate female, pregnant with her first child, there was daily pain in the womb for a month before the child was born; and these pains had so far the external characteristics of labor, that the most experienced practitioner might be deceived by them, until he should clear up the diagnosis by the Touch. The Touch alone could convince him that the os uteri was not in the least concerned in the matter; the tubule or cylinder of the vaginal cervix remaining as completely undeployed as in the most perfect repose of the gestation. In all such instances, the globe of the womb is sore to the touch, and only the slight occasional condensations that occur in all wombs towards the close of pregnancy could be looked to as the sources of the patient's distress. It may well be conceived that a rheumatic uterus could not but be painful whenever its parts should be disturbed by the normal contractions of its muscular tissue. This remark, however just and important to the Student, is not new; for Portal, who practised in the middle of the seventeenth century, expressly declares that he met with women in whom the womb became dilated to the size of a piece of fifteen sols, and then closed again; the pregnancy continuing to the full term; when they were delivered without at any time experiencing any serious inconvenience from the circumstance, p. 4.

In certain examples of rheumatism of the uterus, I have found the patient with a sore belly, often supposing herself in incipient labor, and as often disappointed; yet disclosing to the Touch a partially dilated os uteri for many days, yea, even for a whole month, before the veritable attack of labor came on.

Let the Student remember that, when he shall be hereafter summoned again and again to a *false alarm*, as it is called, for the same patient, he will probably have to treat a rheumatismus uteri.

Let him bleed such patient; let him keep her in bed, covered rather too warmly than not enough so with bed-clothes; let him give her some doses of Dover's powder, or anodyne enemata, at night; let her abdomen be bathed two or three times a day with equal parts of warm oil and laudanum, and let him see to it, that she entertain a soluble state of the bowels by means of gentle aperients, of which a pure precipitated sulphur, with calcined magnesia, is the most to be desired.

CASE.—I advise the Student early to come to the resolution of being cautious in giving his diagnosis and prognosis of these doubtful cases of labor. I know that there belongs to professional men a disposition to *pronounce* at once. This, perhaps, arises from a false pride, which prompts them to seem to know all things at a glance, or by mere intuition. If the young beginner, being called to a supposed case of labor, should witness a very regular recurrence of pains in the belly, and should also place his hand on the abdomen of the woman during one of these pains, he might find it very hard, and be led to *pronounce*, "Yes; it is her labor." Let him never pronounce, let him never give an *opinion*, until he knows upon what it is founded. For example: I was called, in the month of July, 1841, to a lady having very regular pains, which she said were like those she had experienced in her two former labors. During one of these, I held my hand on the abdomen, which became hard, and evidently so because the womb was contracting strongly. "How far are you advanced, madam, in your pregnancy?" "Seven months and one week, sir!" "In that case I ought, before making any prescription, to learn absolutely whether the womb is opening or not; for if it be opening, then your labor is begun, and must proceed; if not, then you ought to have some remedy to prevent it from beginning, lest your child should be born prematurely, and thereby lost, from its non-viability." Effectively, I found the os uteri open so much that I could introduce two fingers and touch the chorion, which was tense. The cervix yet retained a quarter of an inch of its tubular form. I said, "You are in premature labor; but, as there is not the least degree of vascular excitement, and no pain except this that you complain of, I shall give orders to send you a portion of laudanum, in hopes of arresting the case here." She went out to her full time, up to which date I was repeatedly called to give assistance in her supposed attacks of labor. But, when the labor came on in earnest, the relaxation of the cervix was already so great that she delivered herself in a very few minutes. I am surprised, when I reflect upon it, that the retentive power of the cervix and os uteri should have enabled her so long to keep the ovum within the womb. This was doubtless a specimen of disordered innervation of the womb, arising from a rheumatic principle acting on the mass of that organ. She had just come ashore from an East India ship, from Madras.

Such cases as the above occur repeatedly in course of a considerable practice. I have seen a patient with the os uteri as large as a dollar, and with strong pains, cease to suffer, sit up, walk about, and even go out for days in succession, before the labor was resumed and terminated.

The regular manner in which labor pains recur has long been the subject of curious speculation. I have not found any writer whose explanation of this periodicity satisfies me, and shall not repeat here for my reader the mere hypotheses which I reject myself. It is enough to state that the contractions increase in frequency and power in proportion as the uterus grows small, or approaches more nearly to the moment of excluding its gravid contents—a most singular phenomenon, which, of itself, is almost sufficient to refute all the existing hypotheses as to the anatomical arrangement and composition of the muscular texture of the organ. The observation, however, is perfectly true. In the contraction of the muscles of locomotion or relaxation, we find that the greatest power of the organ is excited at a point midway between elongation and the greatest condensation. Thus, the biceps acts with the greatest force when the arm is bent to a right angle, and not when it has drawn the hand up to touch the clavicle, nor when the arm is fully extended; but in the case of the uterine fibres, if we adopt the common theories, we must admit that the nearer the extremities of the muscular fibres are brought to each other, the stronger do they act. In the case of the uterine fibres, whatever be the cause of the first contractions, or whatever be that of the periodical return of them, both the forces, periodical and dynamic, seem to acquire strength by exertion. The weakest pains are those which are met with in women who have the womb enormously distended with water, or with twins; the uterus, in such cases, seeming to be distended beyond the just limit, and to lose thereby its tonic or contractile force; a case similar to that which is observed in an over-distended bladder, which, as is well known, refuses to act upon its contents; so that, even with the catheter introduced, it is sometimes necessary for the physician to aid the bladder by pressing his hand strongly upon the hypogastrium.

The indisposition to energetic movement in a womb too greatly distended by an excessive quality of liquor amnii, or by double pregnancy, may for the most part be obviated by early rupturing the ovum, and allowing the waters to run off; but we cannot, even by this practice, always remove a certain atony or apathy of the womb, which embarrasses the labor very much; nor prevent a troublesome hemorrhage after delivery, the consequence of that atony. The womb, like the bladder, when once overstrained by distension, is exceedingly prone to relax and fill, so as to become over-distended again, because it is inert—atonic.

In a labor pain, it does not happen that the whole muscular apparatus of the womb enters into contraction at the same moment of time. The fundus may be the first to begin the contractile movement, or the muscular mass of the cervix may take the initiative in the action, which, extending slowly over the whole muscular tissue, engages it at length in one uniform and equable effort at condensation of the whole womb.

The observation of this fact is due to the celebrated Wigand, already quoted, one of the most careful and intelligent investigators of the phenomena of parturition who has existed in any age or country.

Since my attention was called to it, in his beautiful work, *Die Geburt des Menschen*, I have many times noticed that the earliest evidences of movement, upon the recommencement of the pain in labor, was a gentle drawing together, constriction or contraction of the mouth of the womb. This motion I have discovered by the Touch, before the woman herself was made conscious of it; and I have said: "Now the pain is come," to which she replied in the negative, but soon corrected her speech; for, as I have said, when the contraction begins in the cervix, it overspreads or extends to the whole organ.

The fundus, in other instances, is the first to exhibit manifestations of contractility. In this case, if the indicator finger be held in contact with the circle of the os uteri, so as, at the same time, to touch the bag of waters or head of the fœtus, it will be found that the bag grows more tense, and begins to descend; or the head moves downwards, being urged on by the contraction of the fundus, before the circle of the os is felt at all to harden or constringe itself.

In a labor pain, the whole womb contracts. Let not the Student, then, imbibe the false notion that the cervix relaxes while the fundus and body contract. It is true that he will find, in a labor pain, that the contraction of the fundus commonly lasts longer than that of the cervix, and that the cervix becomes more dilated towards the latter half than in the first half of a pain, agreeably to Wigand's observation, *ante.* If a pain continues twenty seconds, and the woman is to be exhorted to bear down her pain, she ought not to begin to bear down during the first ten seconds, but she should exert herself to improve the last ten seconds. The advantage of doing so has appeared to me very great, in numerous labors that I have superintended.

In the matter of labor pains, it is worthy of remark that the tenor of them is uncertain, and the action often capricious. For example, the cervix may give way regularly and progressively to a certain point, where its dilatable disposition ceases, for a time. It is wrong to prognosticate of a matter so uncertain. A man founding his prognosis upon the uniform progress of the dilatation in a labor may announce that the end is nigh—when the dilatability is only nigh to a certain point, where it is destined to stop for many hours.

Near the end, when, by the contractions of the fundus and corpus uteri, the child's head has been forced partially into the vagina or quite through the os uteri, the tenesmus, or straining with the auxiliary or abdominal muscles, begins, and, as I have already mentioned, the whole womb, with its contents, is now pushed downwards. Under these circumstances, the circle of the os uteri first descends very low in the excavation, and its anterior lip may be felt, stretched behind and across the pubic arch, a little below its crown. There is no labor in which the anterior segment of the circle of the os uteri does not descend lower than the crown of the pubal arch in front; but as soon as the mouth of the womb is fully opened, and the head completely lodged in the vagina, the lips of the womb ascend, probably, quite to the top of the pelvis in front, and as high as the projection of the sacrum behind—the os uteri encircling the throat of the fœtus with a gentle or moderate constriction. At this stage of the labor, the fundus uteri approaches much nearer the os uteri—nearer by at least four inches, or four and a half, perhaps.

When the head escapes from the vulva, the thorax of the child takes its place in the vagina, and at last, as the thorax emerges, the abdomen and lower extremities succeed it in that place, so that soon, nothing remains in the womb but the placenta and membranes, with a few ounces of blood and water. The fundus is now not more than five inches from the os uteri, instead of twelve inches, as it was at the beginning of labor. The womb is strongly contracted in the last expulsive throe; and if the placenta were not detached even earlier than this, it could scarcely retain its connection with the uterine surface, now that its superficies is so greatly reduced in size. In fact, we do find, in a large majority of cases, that the placenta is pushed wholly or in part into the vagina, by the same pain that forced the abdomen and breech of the child to take that situation; or, if it be not thrust quite out of the womb, it lies loose and detached within the cavity of that organ, and ready to be expelled upon the slightest renewal of contraction, or even by the voluntary expulsive effort of the abdominal or auxiliary muscles. Instances do occur, of a morbid adhesion of the placenta to the womb, in which it is not detached even for some time after the birth of the child; and I think I have noticed that, where the attachment exists at the anterior part of the cavity, it is least apt to be thrown off by the same pains that expel the child. The constringing movement at the fundus is greater than at the front or back of the womb; hence, a placenta attached to the fundus is more likely to come off well than one seated on another part of the cavity.

Extrusion of the Placenta.—The separation of the placenta is commonly followed by an effusion of blood. This effusion is inconsiderable in proportion as the action that condenses the uterine tissue is more energetic and stable. It is supposed that nearly all, if not all, the blood that comes off, flows from what was the placental surface of the womb. Now, as the placenta is from fifteen to twenty inches in circumference, it will occupy a space equal to such a superficies, on the womb, before labor begins; but when the womb has contracted so as to be no bigger than two fists, the placental surface of it must at last come to be not more than one and a half or two inches in diameter, so that the effusion from its vessels is greatly checked, and, in very tonic uteri, wholly suppressed for a time. If in any case the tonicity ceases to exist, then the womb expands again more or less, and blood begins to flow. The womb owes its condensation to the muscular contractions, for the muscular fibres are disseminated everywhere in the substance of the organ; but, inasmuch as there is a great deal of arterial, capillary, venous, absorbent, and cellular matter that serves to make up the sum of the uterine mass, these materials, which are not contractile, serve as elastic resistance, antagonistic to the muscularity, and thus cause the organ to spring open again as soon as the muscles relax, or lose their tonicity. It is desirable, therefore, after delivery, to have a well-contracted and tonic womb.

The Child.—During the whole of this process of parturition, the child is quite passive: if alive, its body possesses a certain degree of firmness and solidity (wanting in the dead fœtus) that enables the womb to force it downwards, and cause it to dilate the parts it is destined to pass through. It does not assist itself; as indeed it could not do, with its thighs and arms flexed upon the body, and the legs crossed perhaps upon the epigastrium, and pinioned by the coats of the womb, which press it together into a compact and passive olive-shaped mass.

If the child be dead, and especially if it have been long dead, its tissues are less firm and resisting; its articulations are all loosened, and even the cranial sutures become relaxed; so that when the contractions of the womb act upon the fœtus to expel it, the whole mass of it yields, to a certain extent, and is squeezed together by the pains. Under such circumstances, the parts to be dilated are opened much more slowly; for a portion of the power is expended or lost in pressing the soft and yielding mass of the child into some degree of solidity before it can be efficaciously impelled against the organs to be riven open. A child long dead, in a first labor, is often, therefore, a cause of trouble. It might almost be true to say that, in this sense a living child helps itself in the labor, while a dead one does not.

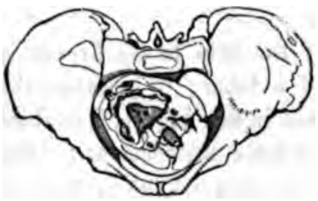
Outward Thrust of the Spinal Arch of the Child.—At the beginning of labor, the womb acts only upon the ovum *en masse;* compressing the membranes and their contents. The lower part of the chorion is pressed like a bag into the os tincæ, and protrudes through it, and is often burst and the waters discharged, before the fundus of the womb comes to press firmly on the child's breech and push it downwards. But, whenever the fundus uteri does begin to compel the child downwards, it can only do so by acting on the pelvic extremity of the spinal column. The cephalic or cervical extremity of this column of course resists the force, and the spine becomes more arched. It is as if one end of a bow were set upon the floor, and the hand resting on the upper end should press it directly downwards in order to bend the bow. The outward thrust of the arch is in this case so great that the ends of the bow strive to retreat to the parallel of the centre of the piece. In the same manner, the cervical end of the spinal arch, attached as it is to the condyles of the occipital bone, will naturally thrust backwards and thus raise the vertex and depress the chin; or I should rather say (as the head is downwards), it will depress the vertex and raise the chin, forcing it towards the infant's breast; while the vertex, which is the occipital extremity of the occipito-mental diameter, descends, as the presenting part. This happens the more readily, as the child's head lies over the pelvic opening, which, so to speak, yawns to receive it.

This bending of the neck, or carrying of the chin to the breast, is a most important act in the mechanism of a labor; it is called the flexion of the head; and when it takes place in due degree, it enables the head to descend into the pelvis with very little obstruction; for the other change, called the rotation of the head, does not take place well if this first step fails. The head of a child at term passes very easily into and through a well-formed pelvis, provided it present certain of its diameters only to the canal. Now the diameter extending from the child's chin to its vertex is 5.5 in many children : but the outlet of the pelvis is nowhere more than four and a half inches, at most. Of course, the child could not be born, should it present such a diameter. Again, the diameter extending from the vertex to the space between the eyebrows, is fully 4.5, and often more than that: but from one ischial tuberosity to the other is but four inches, so that, were the occipito-frontal diameter of 4.5, to become parallel with this bis-ischiatic diameter of four inches, the head would stop; it could not descend any farther. The vertical diameter of the head is, however, only 3.75, which is smaller than any one of the pelvic diameters; so that no great obstruction can, in any natural labor, be offered by the bones, provided the chin be, early in the process, borne strongly against the breast, so as to make the vertex descend, and cause a considerable dip of the horizontal diameter of the fœtal cranium.

Positions.—The word position, in Midwifery, refers to a relation existing between a cardinal point on the pelvis, and a cardinal point on the child's head. The cardinal point on the pelvis is the acetabulum, or rather the acetabular region. The cardinal point on the child's head is the vertex or posterior fontanel. When these two cardinal points come together, the position is number 1, and the other positions are called 2d, 3d, 4th, 5th, or 6th.

The promontory of the sacrum juts into the superior strait in such a manner as to turn any rounded body off, either to its right or left side, and accordingly, it rarely happens that either the forehead or the vertex can pass down immediately in front of the promontory; but, as there is a sacro-iliac concavity on each side of it, the vertex, or the forehead, passes down in this concavity, which gives to the head an oblique direction, as to the opening, or plane of the superior strait. The cut shows how the intrusion of the promontorium into the outline of the superior strait may serve as a guide to the forehead, compelling it to rest in the right, or in the left sacro-iliac space, as the case may be. The forehead, in a majority of instances, goes to the right of the promontory, or in front of the right sacro-iliac symphysis, while the vertex descends below the brim, opposite to the left acetabulum; not at a fixed point, but either nearer the front of the pelvis, or more posteriorly, as the case may be. Indeed, the child generally is found to bore with its head, so as to turn the vertex now forwards, and now backwards, until at last it becomes fixed in one position, by getting under the arch of the pubis. So common is it to observe the child to descend with the vertex opposite to the left acetabulum, that that is taken or counted as the first position of a vertex presentation; and Baudelocque, whose authority on this subject is much followed in the United States, enumerates a second, third, fourth, fifth, and sixth position, the enumeration or order being founded on the supposed relative frequency of the several sorts, as they are met with in practice.

Fig. 81.



Thus the most frequent, according to Baudelocque, is the first position, in which the vertex is directed to the left acetabulum, and the forehead to the right sacro-iliac symphysis. Here the two cardinal points come together.

Next in order is the second position, in which the vertex is to the right acetabulum, and the forehead to the left sacro-iliac symphysis.

The third position is that in which the vertex is behind the pubis and the forehead in front of the promontory.

The fourth position is that in which we find the vertex at the right sacro-iliac symphysis and the forehead towards the left acetabulum.

The fifth position is that in which the vertex is at the left sacro-iliac symphysis, and the forehead towards the right acetabulum.

And lastly, the sixth position, wherein the vertex is at the promontory and the forehead at the symphysis pubis.

It is doubtless extremely convenient and proper to reduce all the possible modes of vertex presentations to a small, yet sufficiently comprehensive classification: but the reader, and especially the young

Student, should remember that all these classifications are human inventions. They are the proposita or the dogmata of different men; and, in fact, it is possible for any presentable part of the head to present itself at any part of the brim. If he should, however, find any difficulty in remembering the order or application of these several positions, let him make use of such an arrangement as the following, which I place before him in this connection, rather than refer him back to an antecedent page.

Beginning with the vertex at the left acetabulum, let him say, vertex left; then, proceeding to the second position, in which the vertex is at the right acetabulum, let him say vertex right, and so on for the whole of the six positions as follows:—

Vertex left, vertex right, vertex front. Forehead left, forehead right, forehead front.

If the vertex be at the left acetabulum, the forehead is of course at the right sacro-iliac symphysis; if it be at the right acetabulum, the forehead is at the left sacro-iliac junction, and *vice versâ;* for all these six positions are vertex positions. So, if it be forehead left, the vertex is at the right sacro-iliac joint. If the forehead be to the right, the vertex is near the left sacro-iliac symphysis; if the forehead be front, the vertex is towards the promontory. Hence I repeat, vertex left, vertex right, vertex front; forehead left, forehead right, forehead front. The first three are occipito-anterior positions, and the last three are occipito-posterior positions.

I have ever found this enumeration the easiest one to remember; and, as a real nomenclature of the positions, I prefer it to all others, and recommend it to the Student of Medicine.

Madame Boivin, in her *Mémorial sur l'Art des Accouchemens,* gives us a table showing the relative frequency of these positions.

In her practice, in 20,517 births, there were 19,584 vertex presentations, of which there were of the

1st	position,	15,693
2d	"	3,682
3d	"	6
4th	"	109
5th	"	92
6th	"	2

Madame Lachapelle's practice in 22,243 births showed that there were 20,698 vertex presentations, of which there were of the

1st	position,	15,809
2d	"	4,659
4th	"	164
5th	"	66

That distinguished Obstetrician, Dr. C. F. Nægèle, Professor of Midwifery at Heidelberg, asserts, that while the most ordinary position of the vertex presentation is that in which it is found nearest the left acetabulum, the one next in frequency is the fourth, or forehead left position, and he calls it therefore the second, in his enumeration. Dr. Nægèle makes this enumeration of first and second positions at page 114 of his *Lehrbuch der Geburtshülfe, &c.*, and at sect. 264, p. 120, gives his views as to the very ordinary occurrence of fourth positions; and at sect. 267, p. 122, declares that, *cæteris paribus*, the forehead left positions are as favorable for the mother, and child also, as the first or vertex-left positions—the vertex rotating spontaneously from the right sacro-iliac junction to the right acetabulum, and then to the pubal arch.

In a conversation I had with this venerable and most honored professor at Heidelberg, in 1845, he gave me convincing proofs of the correctness of his opinions of these circumstances.

Indeed, I had kept a register of presentations a few years before, upon learning, through a publication of Dr. N.'s *Mechanism of Labor*, made by Dr. Edward Rigby, now of London, that the common view, as to the greater frequency of the vertex-right position, was erroneous. I am fully convinced, by my register, and by the course of my clinical experience ever since, that Professor N. is quite correct in his statements; and I venture to assure the medical Student that, while he shall surely meet with vertex-left positions more frequently than any others, he shall as surely find the forehead-left positions next in point of frequency.

This is a comfortable doctrine; for, the tyro, who has studied in the books the so-called mechanism of the head in the pelvis, is very likely to be startled at the first case of forehead-left presentation he shall meet with; but if he now learns that it is a natural position, and the one second in point of frequency, he will not suffer himself to be disturbed by the occurrence; particularly if he remembers Dr. Nægèle's assurances, as above expressed. Dr. N.'s words are: "Die geburtèn bei der zweiten shädellage gehen, unter übrigens ganz gleichen umständen, durchaus ohne grössere Schwierigkeit als die bei der ersten, vor sich, und es hat nicht den allermindesten Einfluss auf die

Mütter oder das Kind, ob der Kopf sie in der ersten oder in der zweiten Shädellage zur Geburt stellt."

Dr. Edward Rigby of London, who was Professor Nægèle's pupil at Heidelberg, translated, some years since, as I stated, a small volume of his worthy teacher's on the mechanism of labor. At p. 36, Dr. N. informs us that, according to his observations during many years, made with the greatest possible care and attention, the fourth position, that in which the occiput is near the right sacro-iliac symphysis, is, after the first, far the most frequent in occurrence of all the head presentations; whereas, he thinks our second position of the vertex occurs very rarely. Out of one hundred labors where the head presented, there were twenty-nine cases of the fourth position; and out of another series of thirty-six labors there were twenty-two of the first, and eleven of the fourth position. The result of his inquiries shows that the fourth is to the first position in frequency, as one is to two and a half.

I am glad to be able to confirm Dr. N.'s statement so far as to say, that I am of opinion, from my own experience and observation, that the fourth position is far more frequently met with, in my own practice, than any other except the first. The reader has already seen in the table, that in Madame Boivin's records the relative frequency was 15,693 of the first, 3,682 of the second, and only 109 of the fourth. I am sure that the statistical record will not be borne out by the experience of any reader of the Midwifery Library. Professor Simpson agrees with Dr. N.'s views.

Mechanism.—Let the head enter the pelvis obliquely, the vertex being in the first, or vertex-left position; it is not to be understood that the dip of the horizontal diameter of the head will carry the posterior fontanel into the centre of the pelvic canal: on the contrary, such a dip would be too great; but the vertex, or posterior fontanel, glides down along the ischium, repelled by that bone, and directed by its inclined plane inwards and forwards; so that it describes a spiral line in its descent, and the vertex, which on entering the upper strait was directed to the left, is, without any change of posture of the child's body, turned near a quarter or a sixth of a circle, to bring it under the arch of the pubis, beneath which it extends itself again after recovering from its first flexion, so as to allow the crown of the head, the forehead, the face, and last of all the chin, to roll out, in succession, from the floor of the vagina and edge of the perineum. These three mutations are the most important in the mechanism of labor: first, the flexion; second, the rotation; and third, the extension of the head. The regular succession of these several states is necessary to an easy natural labor; and the principal business of the medical attendant, in such labors, is to see to it that they occur in due order and time.

I am reminded here of the necessity there is to warn the Student to pause for a moment, and consider what is really the presenting part in a first or vertex-left position. He should reflect that the fontanel, which is directed towards the left acetabulum, is a good ways off from the ostium vaginæ towards the left—and that, in fact, the part that he Touches in his Examination is the right parietal bone, whose parietal protuberance meets the point of the finger introduced for the exploration or diagnosis. To reach the vertex, therefore, he must carry the palp of the finger upwards and outwards, and backwards towards the left acetabular region, where it will come in contact with the triangular or occipital fontanel. In second positions or vertex-right positions, it is the left parietal boss that presents, and so on as to the rest of the positions. The vertex, therefore, is not, strictly speaking, the *presenting point*, in vertex labors.

As to any person's being able to explain the mechanism of the pelvis, or its operation in parturition, without the aid of the subject, either recent or dried, I hold it to be an impossibility. Let the Student, therefore, who wishes to comprehend this matter, which involves probably the most important information that he will have occasion for in obstetric practice—let him take a dried pelvis and a fœtal cranium, each well and naturally proportioned to the other—let him plunge the cranium into the excavation, holding it in the first position, but without flexion; he will find that it cannot descend very far, on account of the rapid approach of the inclined planes of the ischia below. But if he now turns the vertex somewhat downwards, or brings the chin upwards, it will descend a little farther. As he presses it downwards, the inclined plane of the left ischium tends to repel and deflect it towards the pubic arch, in which direction no great bony resistance is offered. If it glance upon the obturator membrane, and indent it, the resiliency of that tissue is sufficient to repel it still more, and still more to deflect it towards the front; in fact, it easily takes a pivot or rotatory movement, which is greatly enhanced or promoted by the structure of the back and lateral parts of the pelvic excavation, which are so inclined as to likewise repel and deflect the forehead, backwards, and cause *it* to fall into the hollow of the sacrum. Let this experiment be tried both with the dip or flexion, and without it, and it will be seen that in the first case the rotation is almost spontaneous, and in the last very difficult, if not impossible, without powerful extrinsic aid.

The rotation being completed, the vertex is found jutting forth under the arch of the pubis; it emerges more and more completely until the occiput, or the upper part of the nucha becomes pressed against the crown of the arch, when the further progress of this part ceases—it becomes a fixed point, or it is an axis, on which the head, as before said, turns or rolls out from the orifice of the vagina, at the close of which evolution the extension of the head is complete.

After the head is born, the face turns again to the side of the pelvis, towards which it was directed at the beginning of labor, or before the rotation began; and that is called its act of restitution. If the vertex was left when within the pelvis, it seeks the left when driven out of the excavation.

While the head is undergoing these mutations, the shoulders of the child are entering the basin. In the first position, the vertex is to the left acetabulum, and the right shoulder to the right acetabulum, while the left one is to the left sacro-iliac junction. As the shoulders descend, the right one rotates towards the arch of the pubis, and the other falls backwards into the hollow of the sacrum; the thorax is now plunged deep into the excavation, where its farther progress is arrested by the floor of the pelvis. A renewal of the uterine effort forces the left shoulder to glide off from the apex of the sacrum and coccyx, and displace the perineum, which it thrusts backwards, out of its way, until the shoulder is born. The edge of the perineum is now retired so far backwards as to allow the right shoulder to disengage itself from above, and then from beneath the crown of the pubic arch; and the body of the child is immediately afterwards expelled with great violence, occasioned by the irresistible tenesmus the woman experiences in this stage; and which compels her to bear down with her whole energy. Sometimes the shoulder nearest the pubis is first expelled; generally the other is the first to be born.

A repose of eight or ten minutes follows the birth of the child, and next, a slight pain, or a voluntary bearing down, expels the placenta and membranes, as before said.

The almost supernatural exertions and struggles of the woman, as well as the painful sensations she experiences, and the novel impressions made upon her nervous system by the successive stages and occurrences of parturition, have brought about a violent excitement of the nervous and circulatory systems of the economy; the former of which is resolved by cries of joy, by tears, and by the delightful sense of security, of triumph, and finished toil, and by that gushing tenderness which a mother feels for her new-born and helpless progeny. The latter rapidly abates, under the greater or less abundant effusion of blood, and the abstraction of the stimulus of exertion, pain, and dismay. The flood of perspiration gradually subsides, and a short sleep, the best restorative, soon permits the patient to feel "comfortable," a phrase peculiarly adapted to the case of a puerperal woman. A review of the whole of the phenomena, both physiological and psychological, that are evolved during the progress of a case of labor, presents perhaps the most perfect example of the condition called hysteria that can be anywhere observed. I shall not devote these pages to a comparison of them with those of an hysterical paroxysm, but merely refer the reader to his clinical observation, whether past or future, for a confirmation of this view of the case. Indeed, the whole matter of a labor is, *ipso facto*, a matter depending merely on the status or modality of the womb, and its influences and sympathies. It therefore is a pure specimen of the local action and constitutional influence displayed by the child-bearing organs, and the whole of what Wigand calls the generation-sphere.

The lochia, for such is the denomination of the bloody discharge that follows, flow in such abundance as to require five or ten napkins to imbibe the blood effused during the first twenty-four hours; after which they decrease in quantity, and grow pale, until, by the tenth or fifteenth day, many women have none but a whitish discharge, which also ceases between the twentieth and thirtieth day.

On the day after delivery, the globe of the uterus appears to be larger than it was immediately after the discharge of the placenta. It can generally be felt, in the hypogastrium, during from six to ten days; after which it retreats into the recesses of the pelvis, diminishing daily in size, until, by the end of the month, it is nearly as small as before it was gravid.

Such is the history of Labor, in general terms, which, though it may perhaps afford a pretty good *coup d'œil* of the phenomena by which it is characterized, is not sufficiently in detail for the purposes of this work; on which account I shall proceed to treat of other particulars in the ensuing pages.

In general, as soon as the signs of respiratory life are fully established in the child, the cord is to be severed by the attendant, who divides the navel-string after having secured it with one or with two ligatures, and puts an end, by this severance, to all fœtal connection with the mother.

As to the child, it comes, in a good labor, healthy and vigorous into the world. The loud sounds of its vagitus, its cries, pervade the apartment, and carry consolation and even transport to the bosom of the fatigued, exhausted, and terrified parent. "Ah, mi corazon! Mi carissimo, querido corazon!" said a Spanish lady, from the midst of her pangs, as soon as the head of her offspring became free, and before the shoulders were born—for she heard its vagitus uterinus—and her heart "leaped up" with passionate expressions of love, to greet it even before it was completely ushered into the world. As a physician, who has passed a life among those who were in pain, in peril, and in fear of imminent death, I must have been witness to many scenes of human emotion—but of all the expressions of love, made manifest and identified in voice and in speech, that I have ever witnessed, the most intense, the most rapturous and sacred, have been the thoughts that breathed and words that burned as they vehemently issued from the lips of a young mother, whose body had just escaped from the fell sufferings of those who, in sorrow, travail in child-birth, according to the primal woe pronounced against the sex.

The child being born, it remains that the secundines, consisting of the placenta and membranes, shall be expelled from the uterine cavity. The same kind of power that was used to force the child into the world is required for the delivery of the after-birth.

I believe that the after-birth comes off in about ten minutes. There are many labors in which the placenta is chased out of the womb into the vagina by the same pain that pushes the child forth. But, in general, this is not the case, the placenta being only loosened and detached, in whole or in part, and left lying crushed up into a sort of ball by the contraction of the womb upon it.

After a repose of some ten minutes, it may be, and it is an indifferent matter, twenty minutes, the contractile power of the uterus is again in activity. This excites the tenesmus, as before, and the woman, bearing down, coincidently with the uterine contraction, pushes forth the after-birth, generally accompanied with coagula, and a quantity of fluid blood. The pregnancy is thus brought to its close.

Lochia.—After the expulsion of the entire product of the conception, the patulous orifices of vessels, left exposed by the separation of the placenta, freely discharge several ounces of blood. This discharge is called lochia. As the cavity of the womb is not obliterated by the conclusion of the labor, it must happen that the blood effused within its capacity shall coagulate, and that the patient shall discharge from time to time a utero-morphous-clot, as large as an egg, or as large, sometimes, as a man's fist. As the organ grows smaller and smaller, these coagula become less and less; the flow assuming more and more the appearance of the menstrua. In the course of a fortnight in some, of a month in others, the last traces of uterine excretion dependent on the late pregnancy have disappeared, and the woman is restored to the Jewish estate of cleanness.

The lawgiver of that ancient race pronounced that a woman could not be clean until the fortieth day. But our Christian women generally deem a month sufficient for the whole process of the uterine purgation.

As to the lochia, let the Student learn that, when the milk begins to be abundantly secreted, which is on the third day, or about seventy-two hours after the close of the labor, the mammary molimen serves to check the determination to the womb; and consequently to lessen the amount of the lochia—which, however, becomes again abundant on the fifth day. Can it be that the opened orifices of the uterine vessels, from which the lochia are discharged, shall return to their normal, non-gravid condition, without the intervention of a state fit to be called phlebitis? Such is the proposition of an able French writer. If those vessels cannot recover their ordinary state without passing through a stage of inflammation worthy to be called phlebitis, however slight that may be, it is certain that we ought to feel no surprise when we find such inflammation to become violent, dangerous, or even fatal, by developing all the phenomena of pyogenic fever, and consequent pyæmia.

Having now given a plain account of what happens in an ordinary labor, I shall in the next chapter proceed to give directions for the Conduct of a Labor. I cannot, in doing so, avoid some iteration, nor shall I apologize further for so doing, since, without repetitions, I cannot possibly maintain the even tenor of the story, for, though Obstetrics is a Science, it is made up of a vast number of unconnected items.

CHAPTER X.

CONDUCT OF A LABOR.

THE conduct of a labor comprises the whole management of a parturient patient, from the first beginning of her pains until the complete exclusion of the secundines; and it ought also to include all that is done for the security of the mother and the child, during the period immediately ensuing the birth. As labors are extremely various in their characters, as to duration, pain, facility or difficulty, the title at the head of this chapter is a comprehensive one, and fruitful of topics which, if properly handled, could not fail to prove interesting and instructive to whatsoever reader might desire, under such a head, to seek for useful, and indeed I might say, indispensable information.

The conduct of a labor might refer to any, and so to all possible events in Midwifery; for Midwifery, after all, is but the conduct of labors.

Any person meriting the name of obstetrician may be supposed competent to the conduct of a natural labor, where the series of phenomena proceeds with rapidity, and in a perfectly natural order of succession and duration, provided he will remember the oft-repeated adage, "a *meddlesome midwifery* is bad;" and be therefore willing to abstain from impertinent interferences. A kindly Providence has so ordered this painful office of parturition, that the accoucheur, in most cases, hath really little to do except to receive and protect the child, and attend to the delivery of the after-birth; extending his care to the disposal of both the mother and her offspring for the first few hours after the termination of the conflict. To show what the proportional number of unassisted or natural labors is, to those that require the aid of science or skill, I may state that out of twenty thousand five hundred and seventy children born at the Hospital de la Maternité, for the time under the care of Madame Boivin, only three hundred and thirty-four required to be assisted; leaving twenty thousand one hundred and eighty-three children that came into the world by the natural powers dedicated to the office of parturition.

Upon referring to Dr. Collins's work, p. 22, it will be seen that of the 15,850 cases observed, 7,050, nearly one-half, were delivered in two hours, and that 11,257 were delivered in four hours of labor, which is nearly three-fourths for the first four hours.

Cautions.—Although it will appear from the foregoing statements that women generally are found capable of helping themselves, yet every labor is not a natural one, nor is every natural one an easy one; and, where the deviation from the normal character of the phenomena is at all considerable, much reflection and prudence are required in order to prevent a natural labor from becoming laborious, difficult, or actually preternatural. Were it so, that all the cases of parturition should end favorably, and pass easily through their several stages, there would, certainly, be no occasion for medical interference, and we might lay down our vocation and take up a less disagreeable one. But the facts happen not so: hence, when a labor is protracted through many successive hours of apparently fruitless distress, the sufferer loudly claims that something should be done for her relief, which compels the medical attendant to employ such arguments and exhortations as may serve to reassure and compose her, or else adopt some real or pretended measures for relief, or for accelerating the birth. In the "Woman's Booke," the venerable Rainald says: "Also the Mydwyfe muste enstruct and comfort the partie, not onlye refreshing her with good meete and drinke, but alsoe with sweete wordes, gevying her goode hope of a speedefull deliveraunce, encouraging and enstomakyng her to pacience and tolleraunce, byddying her to holde in breath so muche as she may, also strekying genttily with her handes her belly above the Navell, for that helpeth to depresse the byrth downewarde."—*Fol.* XI.

That practitioner confers a real benefit on his patient, who thus, by kindness, by a proper degree of candor, or the evident possession of confidence in his own knowledge or skill, either convinces the patient that the time is not at hand for intervention, or that, when the time shall arrive, all the needful judgment and dexterity will be employed for her security. A woman may utterly fail of all her courage and firmness, and so, by falling into a despairing or fretful humor, greatly retard and embarrass the parturient processes, to that extent, indeed, as to render some manual operation necessary, merely because she has lost faith and trust in her attendant; which irritates her mind so as to act most disastrously on the physical functions: whereas, she shall recover a great, and indeed a sufficient degree of power, immediately upon the appearance of some other person, either celebrated for his professional abilities, or exhibiting, in countenance and manner, the evidences of confidence in himself and in the resources of his Art. This observation, which is of the greatest truth and importance, is to be found in that admirable volume, the *London Practice of Midwifery*, which is supposed to present a summary of the lectures of Dr. Clarke, of London.

Most women have not the slightest knowledge of the anatomy of the parts interested in labor. If a woman suffering the wildest terror, and magnifying her distress by fearful apprehensions of effects to be produced by her pains, could be made to understand as clearly as the doctor himself the cause of them, their uses and results, she would be no more terrified by them than the physician himself. She would become tranquil, patient, contented, and even cheerful under sufferings, which should otherwise frighten her out of all propriety.

Many have been the occasions for me to take a sheet of paper, and, with a pencil, and competent explanations, show her by a diagram, the whole *theorick and pracktic* of the grinding pains which she could not bear before she knew, but received and bore with thankful graciousness, after she had learned their nature and purpose. Such an explanation is better than chloroform, and more anæsthetical.

The young practitioner, who sometimes permits his own disappointment to affect in any degree his remarks or his gestures, exerts a very injurious influence upon his patient. He ought under all circumstances to retain a perfect command over his feelings; and, above all, to be in full possession of the most accurate theoretic knowledge at least, of the processes about to be perfected, and of the measures that are indicated in their several stages, whether they occur in the natural order and manner, or whether anything happen, or arise to interfere with or obstruct them. Such a practitioner will rarely lose the confidence of his patient, no matter how severe or protracted her sufferings may be. He will support her spirits and hopes with his steady and confident assurances of relief in due time, and thus prevent the mischief that ensues where the mind, distracted with pain, fatigue, and dismal fears, carries disorder into all the functions of the body. Nothing conduces more commonly to the production of the very uncomfortable state of things now alluded to, than the making of rash promises or prognostics. No one can know beforehand when a labor shall be terminated. If the first stages proceed ever so favorably, the latter may give the greatest possible trouble; and any failure of a prognostic cannot but diminish the woman's reliance upon the ability of her attendant. No good practitioner makes them. Let the Student of Midwifery, therefore, early resolve to avoid all the difficulties which arise from such great imprudence.

It is true that the adept practitioner can sometimes make shrewd guesses as to the hour of deliverance—but he who sometimes gains a small credit for his success will find that he is a loser, in the main, upon the prognostications he may have made. Some very good grounds of prognosis he may take upon the fashion or form of the woman's body, as I have shown from Wigand, at page 57 of this volume. He ought to learn something of her stature and shape—and it is proper for him to inquire as to any obliquity, any over-distension, any deviation that may exist—and this he can do without offending the delicacy of the patient, who will rarely refuse to rise from her seat and stand up before him, that he may know if all is right as far as can be deemed by external palpation. If she be lying on the back, it is not at all difficult even to make out the diagnosis of the presentation, either by feeling the orbicular head at the fundus or cervix, or by auscultation of the abdomen. If he should find the fœtal heart nearer to the fundus than to the cervix, he will know that the case is one in which the pelvic extremity presents. I have repeatedly ascertained, by touching the belly, during the absence of the pains, that I was to treat a breech case—and have made all my arrangements accordingly.

Cautions as to the Circulation.—Few women go through labor without a great acceleration of the pulse, and increase of its force and volume. This excitement is sometimes attended with the development of nervous symptoms, to such a degree as to require measures for its diminution. When carried to a certain extent, an increased activity of the circulation is very advantageous. It develops in the nervous system, both cerebral and ganglionic, a vast increase of energy, which is acknowledged and responded to by every part of the constitution, particularly the circulatory system; and it serves to hasten the arrival of the happy moment of release, by augmenting the expulsive energies of the womb, to the vigorous and regular contractions of which a somewhat elevated state of the vital forces seems requisite in almost all cases. It should not be interfered with, then, except under peculiar circumstances; as, for instance, where it occasions headache, mental excitement verging towards delirium, or tremors, and irregular action of the muscles, carried to an unsafe extent. The excess of excitement ought to be removed in such cases, in order to prevent it from passing first into fever, and afterwards into debility and exhaustion, the constant results of a great excess of it; and more especially, to obviate the danger of convulsions, apoplexy, and other accidents to which the female constitution is obnoxious under violent excitements or efforts. I have in a great many instances observed, that the pains have fallen, or become irregular and spasmodic, in consequence of this constitutional irritation, and that they have recovered their vigor and regularity by removing the excess of bed-clothes, bathing the hands, face, and throat with cool water, and by the exhibition of cooling drinks, together with free ventilation of the apartment. Great comfort and even renewal of strength, hope, and courage, commonly follow a change in the outward circumstances of the patient, as to her bed and other things relative to her labor. Thus a woman who may have been lying for seven or eight hours upon the same spot, comes, at last, to sink into a sort of pit made by the weight of her hips. The continued escape of fluids, as urine, liquor amnii, blood and serum, which are all heated by the heat of her own body, is frequently found to wet her up as far as the shoulder blades: and she remains pinioned as it were to the spot as if lying upon a blister, aching in every limb, and imploring death, which she really expects. Such a person should, as a mere office of humanity, be taken up, cleansed from head to foot, and replaced upon a bed made up with clean bed-clothes. In cases where these simple cares would not suffice, I have scarcely failed to re-establish the regular course of events by taking blood from the arm.

Notwithstanding that most women have a greatly increased frequency and force of the pulse during the more active stages of labor, it is not universally the case; some females passing through the whole process without any change whatever in the rate of the circulation.

CASE.—The following case was under my care on the 9th of February, 1828. Mrs. B., aged twenty-five years; in labor with her first child; was attacked with the pains at seven o'clock A. M., and was delivered at twelve o'clock of a healthy female infant. The whole amount of blood discharged at the separation of the ovum did not exceed three ounces. The pulse was very slow throughout the labor, not exceeding *sixty-five pulsations per minute*, even during the most violent expulsive pains. Some time after the complete expulsion of the secundines, the os uteri was two inches in diameter, and as hard and smooth as a ring of ivory.

CASE.—November 3, 1840, I attended Mrs. W. C. L., aged twenty-two years, in labor with her first child. The pulse during the whole process never rose above seventy-two, and soon after the birth of the child fell down to sixty-five beats per minute. The labor commenced at two o'clock A. M., and terminated at five o'clock P. M. The pains, even the great ones, were but a few minutes apart, so that I have rarely witnessed a more tedious one, notwithstanding many have fallen under my notice which were much more protracted.

I could cite from my practice many cases in which the pulse was quite unaffected throughout the whole process of parturition.

Professor Dewees has been justly celebrated for the boldness and good judgment with which he has resorted to venesection, in some cases of labor. The quantity drawn by him, in instances which he has reported, although, doubtless, fully demanded by the exigencies at the time, and justified by the results, may, nevertheless, have induced some persons of lesser powers of discrimination unnecessarily to resort to a similar mode and extent of depletion; hence, it is not uncommon to hear of very large bleedings, of thirty or forty ounces at a time, during labor. I must aver, that I think such very large abstractions of blood not often necessary, and would, therefore, take this opportunity to warn the reader to discriminate carefully, in making up his judgment concerning the quantity to be drawn in each particular case. For example, where the woman has become too much excited as to her circulation, in the manner above pointed out, I have no idea that it is necessary to draw away a great quantity of blood: let him not bleed, then, until, to use a very common phrase, the pulse is soft. He does not want a soft pulse. In labor, or at least in the violent stages of labor, the pulse ought to be full, vigorous, and somewhat accelerated. If he bleeds till the pulse becomes soft, he will substitute for a state of excitement and excessive power, one of debility and lowness, quite as much to be deprecated.

The purpose of venesection, in the instances I at present propose, is to take off the strain of the blood-vessels—to mitigate the general stimulation which ensues upon too rapid a revolution of the blood. I therefore think that it is better, for the most part, to limit our bleedings, for these general purposes, to something under, rather than beyond sixteen ounces. But on the other hand, where symptoms, strongly threatening, of apoplexy, convulsions, pulmonary hemorrhage, inflammation, &c., make their appearance, the lancet should be used in the most fearless manner. The same is true of those cases where a great relaxation of the tone of the tissues is required for some special and pressing object, such as the relaxation of a strictured vagina, or a very rigid uterus, the removal of a violent congestive or inflammatory accumulation of blood in the brain, &c., &c.

Alvus.—It is difficult to conceive of an individual who, when under high excitement, whether from fever or other causes, doth not experience a considerable diminution of that excitement, upon the operation of an aperient or cathartic medicine.

The facility and promptitude with which the alvine discharge can be effected by means of enemata render a resort to them of very common occurrence; and, in fact, where only a slight reduction of excitement is wanted, they answer the end proposed very fully; yet a dose of some neutral salt, of magnesia, or castor oil, may be beneficially administered, in instances where there is a promise of sufficient time for the alvine operation to take place before the delivery of the child. Aperient doses are the more evidently indicated, in labor, because it cannot be doubted that the constitutional disorder brought on by the pain and fatigue of labor, must, in some measure, extend to the digestive organs: nothing, indeed, is more common than to meet with parturient patients who vomit very much; while water-brash, heartburn, and sour eructations are also exceedingly common, and often quite distressing.

As to the exhibition of purgative medicines to women in labor, it ought to be understood that, in the selection of the article, care should be taken to provide one not likely to operate with violence; which would be very objectionable, both as to the trouble it might give during the parturient process, and the inconvenience experienced by alvine operations occurring soon after the birth of the child. For my own part, I prefer, in general, that such a patient should not have a dejection until the third day. Still, I very commonly advise the exhibition of a dose of castor oil, in cases where I have to fear a long and reluctant dilatation of the cervix. I administer the drug in such cases, because I seem to have observed that the operation of it tends to subduct the power of the cervix and os uteri, or that it relaxes the sphinctorian force of the retentive fibres of the uterus, as it does that of the sphincter-ani muscles. It excites also the expulsive faculty of the womb, as it does that of the colon and rectum, and abdominal muscles.

Case.—This day, September 2d, 1848, I found an os uteri not bigger than a swan's quill, though the waters had gone off full fourteen hours, and the woman had had sharp pains for eight hours. I gave her a tablespoonful of oil, and in three hours the child's head had passed through the dilated os into the vagina.

The foregoing remarks tend to show not only that medicines of an aperient kind are frequently indicated in obstinate and protracted labors, but they ought to show that care is required as to the exhibition of food to such patients. Some food is wanted, particularly for those whose pains are of the lingering kind and allow the process to remain unfinished for many hours. For the most part, tea, bread or gruel, sago, &c., are found to suit the patient best. The best drinks are gum-water, toast-water, lemonade, cold water, and such like articles; the object here being to sustain the system, by means of nutriment and drink while under severe effort, at the same time that we carefully avoid calling the force in the direction of the digestive organs by overtasking them. The whole powers of the economy should, therefore, be husbanded and preserved, as much as possible, in their normal condition, in order that they may be directed and determined towards the womb and its auxiliary organs. In the case of a very slow labor, which should be unattended with constitutional symptoms, or any evidences of gastric disorder, a light broth, or even some small portions of very digestible meat, might, upon due reflection, be allowed to the patient.

Decubitus.—The attitude of the patient exercises, in many circumstances, a notable influence on the progress of labor. It is the almost universal custom, in this country and in England, to direct the woman to lie upon her left side, with the knees drawn up; a posture which is highly convenient to the practitioner, and productive of the least possible exposure of the woman's person. But where the labor proceeds slowly, the heat and the pressure occasioned by lying still, under such circumstances, become highly injurious. The woman ought, therefore, to be directed to turn on her back, or even on to the opposite side, or to rise and sit in an easy chair, from time to time. I do not recommend that she should be too much urged upon this point; and I remark, that the influence of custom is so great, that a proposition to turn on the back is not unfrequently received here, with something like astonishment and aversion by the bystanders, who seem to regard that attitude as, at the least, one of indelicacy. Hence, it is proper to assign reasons for the request.

In cases where the retardation arises from an improper direction of the expulsive forces, it is of the highest importance to direct the patient as to her attitude. For example, if a lateral segment of the os uteri can be felt towards the middle of the pelvis, and the other one is either out of reach of the finger, or very high up on the side of the ischium, it will be found that the fundus uteri is directed to one side of the abdomen, giving more or less obliquity to the long axis of the womb, and of course an oblique line of direction to its forces, which are decomposed, or partially nullified thereby. A change of position to the back, or the opposite side, will bring the orifice of the womb to its proper place in the pelvis.

Case.—On Sunday, November 30th, 1828, I was sent for to visit Mrs. C., whom I found lying upon her right side. The pains seemed so expulsive, that, when I arrived, I expected to receive the child immediately, for she bore down like one in the last throes of labor. I requested her to turn upon the left side, informing her that that position was the most convenient for me. She did so. The pains now became efficient, and partook, in appearance, of the character of the grindng pains. I found that the uterus had obliqued far down to the left ide, as soon as she turned over, which interfered with the due exercise of its power. She was again placed on the right side, which brought he womb into its proper line of direction, and the labor ended, after hree or four pains. The same consequences follow from an anterior obliquity of the axis of the uterus; but, in this case, the anterior segment, or lip of the womb, seems to hold the head as in a sling or pouch; he anterior portion of the cervix being stretched across the head, far behind the middle of the pelvis; whereas the posterior edge of the ircle either cannot be felt at all, or is felt high up towards the promonory of the sacrum. It is evident, that in such a state of things, a good deal of power must be lost in pushing away the anterior part of the cervix, a power that should be determined and more usefully employed in he proper direction. We are advised, in order to remove the difficulty, to draw the os uteri forwards towards the symphysis, and retain it there by the fingers; but there are in many cases a rudeness and violence n this plan, which will be easily appreciated by such as shall make the attempt, and who, moreover, will often find that they cannot retain it in the desirable place, without giving pain, and exerting so much force as to expose the os uteri to contusion or rupture. If the woman lies on her back, the fundus uteri will retire towards the spine, bringing its axis into the proper range; and of course the plane of the os uteri will take its proper station: the child will, in some instances, be delivered much sooner if this precaution be taken, than if it be omitted.

When we meet with patients who allow themselves to be violently agitated by the pains of labor, so as to require actually to be held, at a period when the perineum is in danger of rupture (and women are now and then so distressed as to lose all command of themselves), the best attitude is the one on the back, with the knees drawn up; in this position they are kept much stiller and quieter than when on the side.

I had a woman under my care in November, 1833, who was so violent that two or three women could not keep her still: when I caused her to assume the dorsal position, she became passive enough.

To assist the Flexion and Rotation.—I have spoken, in another place, of the dip of the occipito-frontal diameter of the fœtal head. The nearer to the middle of the excavation we find the posterior fontanel, the greater is the dip. In the conduct of labors, we may exert a most beneficial influence, by paying due attention to the dip of the occipito-frontal diameter, which ought to bring the posterior fontanel down towards the axis of the excavation; not down to the axis, indeed, but yet not too far off from it. The vertex must always, at first, be towards one of the lateral pelvic walls. But where the posterior fontanel is found quite up towards the side of the pelvis, and the anterior fontanel is at the same time within reach of the finger, we may feel assured that the dip has not taken place, and the retardation of the labor may safely be attributed to that cause, for the chin has somewhat departed from the breast. Could we, under such circumstances, get the vertex down, or more towards the centre of the pelvis, the pains would be more successful. Now, as the edges of the parietal bones over-ride the edge of the occipital bone, they form a ledge, which gives a good purchase for two fingers, which, when applied upon that ledge, are generally enabled to draw the vertex downwards to the required position. Whenever this operation is to be attempted, it should be tried during the absence of the pains; and when the vertex is once pulled downwards, it ought to be retained in its place until a new pain comes on, and thus enables the operator to secure whatever advantage he has gained. Should the head be placed, by this gentle method, in the desired attitude, it is as easy to conceive, as it is indeed common to witness, the increased facilities it affords for the delivery.

In this case it is useful sometimes to make the womb take an oblique position in the belly. For example, suppose the vertex to be to the left, and to be unable to dip: it is clear that if the woman should lie upon her left side, and if the fundus of the womb should be thrust down towards the left side, the vertex would have less difficulty in descending.

I have always found it much easier to pull the vertex down than to push the forehead up; because, the finger acting upon the ledge above described, does in reality act upon the longer end of the lever, of which the atlas represents the fulcrum; whereas, in an attempt to push up the forehead, so situated, the lever we use is very short—its real xtremity would be the chin; but we cannot reach that part. Morever, when we attempt any strong force, the bones of the os frontis re so yielding, that they are readily indented, and we are obliged to esist for fear of contusing the brain; the fingers, in fact, being aplied near the upper edge of the os frontis, where the ossification is as et very incomplete. The same objection does not hold as regards the osterior edges of the parietalia and os occipitis, which are very firm efore birth.

The labor may be retarded by the failure of the head to undergo *otation.* It is sometimes very difficult, at the bedside, to learn whereore the head does not rotate, in a patient, who, in another labor, meets ith no such difficulty. I am aware that it frequently arises from ailure of the dip above spoken of; but I wish now to speak of a case n which the head has sunk very low, where the dip is good, but et the rotation fails: I have on many occasions, after much doubt and nxiety upon the subject, found that it could be fully accounted for, y referring to the grasp of the cervix uteri, which actually bound and eld the head so firmly, that it was unable to execute its pivot motion. he remedy, in such cases, is patience; for as soon as all resistance of he cervix is over, in consequence of the fatigue of the parts, or the equisition of a perfect dilatability, the pains will push the head down, nd the inclined planes of the pelvis will cause it to execute its spiral r rotatory movement in the most rapid manner.

In all the cases where the rotation fails for want of the requisite dip, or approach of the chin to the breast, let that want be supplied by pulling down the vertex as directed. It must be admitted that such gentle measures will not succeed always; but we have, then, the powerful resource of half the hand, which may be introduced into the vagina, and sometimes within the cervix; and which, taking the head in its palm and fingers, can place the vertex wherever it may be desirable to fix it. It should be remembered, however, that a vectis is, very rarely, but yet sometimes imperatively demanded for the management of such a case.

To correct Obliquity.—The obliquity of the womb, which, by vitiating the direction in which its forces act, may greatly retard the progress of a labor, may also be a cause of failure both of the dip and the rotation of the head. Suppose the breech of the child to lie very low down in the right flank of the patient; if the vertex be to the left side of the pelvis, the dip will be with difficulty effected, and the rotation must in consequence fail. The remedy is to correct the obliquity by changing the position of the woman. It is easy to conceive that, if the vertex remain directed still to the left, and the breech could be now thrown far down to the left, the dip would be very much facilitated. I have on many occasions reaped the benefit of attending to this point.

Vaginal Vesicocele.—Labors are rendered slow, painful, and even ineffectual, by vaginal vesicocele. The bladder of urine in these instances, instead of maintaining its place in front of the womb, appears to fall down below the top of the symphysis of the pubis, making a soft, elastic, and painful tumor there. Sometimes the depressed bladder is directed to one side of the pelvis, as in the following instance, which explains the circumstances of such a case better, perhaps, than could be done by a long dissertation.

CASE.—Mrs. B.'s labor.—September 8th, 1848, 12 M. In labor since yesterday morning. Expected her confinement last month, about 15th to 20th.

She recovered from her last menstrua November 10th, 1847, and has not *seen* since that date. If we adopt Prof. Nægèle's method of calculation, and go back to October 10th, September 10th, and August 10th, which is three months, and then add to August 10th seven days, we should look for the accouchement on the 17th August. In fact, on that day she had a considerable show,—which was repeated for many days, inducing her to keep her chamber, which she has not since left. Her pains are now frequent and attended with violent tenesmus or *bearing down*. By the Touch I find the os uteri very high and scarcely to be reached—open to the size of a ten cent piece, very thick and hard; the head presents; the membranes unruptured. Having made this careless diagnosis, and given some directions as to the conduct, and prescribed for the tenesmic distress, I saw her again in the evening, about seven o'clock. The pains, it was said, had been repeated every few minutes; and upon coming into the apartment, one would suppose the child was pressing upon the perineum violently, so loud was the sound of her respiratory effort in bearing down.

She had passed the scanty urine very often; the bowels had been moved by an enema. I immediately examined, expecting to find the child's head under the arch, but was surprised to discover that it had not advanced at all since mid-day. The os uteri might be as much as an inch in diameter, and not more. While carrying the finger to the os uteri, it appeared to encounter a sort of cushion-like tumor occupying chiefly the right half of the Excavation. On the left side of the Excation there was nothing abnormal—the finger could be pressed to the ft as far as the ischial plane. Upon discovering the tumor in ques-on, my first impression was that it was a case of pelvic enterocele like at in Dr. Bicknell's patient; but farther exploration showed that it as not in the recto-vaginal peritoneal cul-de-sac—which cleared up e diagnosis on that point. I asked again as to the urination—which d been frequent, not free.

I introduced a catheter into the urethra—but when it had advanced out two inches it stopped, nor did any urine escape. I expected to rry the point of the catheter downward and backwards into the mor, which I now presumed could be nothing else than a cystocele, nsisting of the bladder of urine, which had been crushed under the omb, and obstructed so as to be unable to discharge the whole of its ntents. Finding I could not cause the catheter to advance without ing imprudent violence, I withdrew it. The patient lay on the back ith the knees drawn up. Introducing three fingers of the right hand r into the pelvis, when the pain was off, I pressed the palps of the ngers upon the inferior surface of the mass, and lifted it upwards wards the plane of the superior strait. Just as I had raised it par-ally up, there came on a violent tenesmic effort—and the urine rushed om the orifice of the urethra in jets so violent as to surprise me. In e course of three or four such jets, the whole of the urine in the ladder was expelled; the tumor disappeared, and within forty minutes, e whole of the remaining dilatation of the cervix was completed and e child delivered.

As soon as the bladder was emptied, the singular, extraordinary nesmic efforts returned no more—but the phenomena of expulsive ction were thenceforth perfectly natural and customary.

The patient, when I came into her apartment, was found to be in a tate of extraordinary excitement, representing her sufferings as intole-able; her face was redly flushed and heated, and the heart rapid and rritated.

This case seems to me worthy of record. First, as presenting an xample of the bladder crushed beneath the uterus. Second, as ex-ibiting the method of making diagnosis of such a case. Third, as howing how it may be successfully treated. Fourth, as proving that ains and distresses that contravene the co-ordinate action of the terus in labor, being removed, the conformable play of its forces may e expected to take place; and, fifthly, as showing that where the ladder is crushed downwards below the womb in labor, it may be, for t was in this case, thrust to one side of the pelvis. In this instance, it was jammed to the right, and not at all to the left side of the excavation. In this very case, even the dilatation of the cervix was held in suspense until I relieved the bladder; whereupon, the co-ordinate contractions of the womb being no longer contravened, they effected the remaining dilatation and delivery in forty minutes.

September 18. The patient is sitting up to-day. She has no urinary distress, and has not had any complaint since the birth of the child, save a feeling of soreness and aching within the pelvis, which lasted only a few days.

Management of the Cervix and Os Uteri.—The head has sunk low into the Excavation; the fontanel is in the proper position, neither too near to, nor too far from the symphysis; but it advances not at all; pain after pain passes over, with great suffering to the mother, and yet with no sensible advance to the head. What can occasion the retardation? The finger passes up behind the symphysis to the superior strait, and moves along the linea ileo-pectinea a considerable distance, showing conclusively that no disproportion exists between the head and the bony canal it is destined to traverse. All uneasiness of mind on the practitioner's part will cease as soon as he discovers that the cervix uteri, which he had thought to be sufficiently dilated to offer no farther considerable opposition, has ceased for a time to yield, and during every pain, takes hold of the head in such a manner as to prevent the parietal protuberances from escaping into the vagina. The proper remedy here, also, is patience; a small venesection; a large draught of some warm relaxing fluid; the fortunate occurrence of nausea; a careful adjustment of the axis of the uterus, and of that of the pelvis; or perhaps a few very powerful exertions of the auxiliary muscles in bearing down, to which the woman can be exhorted. I have often, after allowing myself to get into a fret relative to the slow progress of affairs, found all my uneasiness dissipated by a more careful examination; thus, as above, clearly ascertaining that no other than soft obstruction existed; whereas, from too careless an examination, I had been erroneously led to believe that the os uteri had mounted up over the parietal protuberances of the fœtal head, and that some unknown cause of retardation prevented the due progress.

Effects of a Bad Sacrum.—The hollow of the sacrum is the essential cause of the specific properties of the excavation. Those properties will be present in perfection, where the sacrum is perfectly well formed and adjusted: but the sacrum may be either too little curved or too

io. I have specimens of both kinds of deviation. Inasmuch as
ation of the head requires, for its regular and easy performance,
l curve in the sacrum, it is striking, that a very straight sacrum
ffer considerable impediments to that important act. Hence, a
i with too little curve will protract the period of delivery; and
, a case might arise, and such a one has arisen, where no rotation
ould take place, but where the delivery, at last, must occur with-
s important act in the mechanism of labor—the vertex coming
der the tuber ischii: a case requiring the very extremest degree
ion of the head. Let the Student reflect a moment, and he will
re what process must be substituted for the rotation. The occipito-
atic diameter is but three and three-quarter inches, but the tubera
re four inches apart; hence, where the rotation fails, there must
a greater dip, causing the occipital fontanel to take a position
in the centre of the pelvic canal, by which the relations of size
n the head and pelvis are restored, and the occipital bone is en-
to pass out under the ischium, and the parietal protuberance under
bal arch. Such a great degree of dip may be much promoted by
lp of the fingers, as before stated, and by pushing the fundus
s far to the left as the case may be, but it will take time. It is
ry difficult when the head is of a medium size.
the other hand, if the sacrum be too much curved, its apex will
wards towards the pubis, so as to form a sort of shelf, on which
ad lies; the expulsive forces being, for a long time, vainly ex-
l in impelling the head down upon this shelf or ledge. The
d compression of the cranium, however, at length moulds it into
uisite form, and allows it to slide off the ledge, and the delivery
place. It is to be understood, that the highly aggravated degrees
vicious conformation involve the necessity of direct interference
ome one of the various instruments employed in obstetric opera-

uence of a Badly Shaped Pubis.—When the pubal arch is
r, but retains the character of early life or of the male pelvis, it
s that great retardation takes place, because the act of exten-
f the head cannot occur in due time. Such a narrow arched
compels the head to continue its descent much longer than one
the arch is broad and low. It has as bad an effect as, and indeed
uivalent to, a long symphysis pubis; for in the ordinary confor-
, as soon as the occipital bone can come to apply itself to the

arch, the vertex begins to rise; extension of the head taking place, and the perineum requiring no inordinate degree of protrusion.

But imagine a pubic symphysis of two and a half inches, instead of one of an inch and a half, and it is plain that the perineum must go much farther down before the head can escape under such an arch.

CASE.—A patient with a very narrow arch had been under my care in two of her labors, in which, the natural pains being insufficient, I was compelled to augment them by the ergotic stimulation. By violent efforts of the womb and abdominal muscles, she gave birth in both cases to living children. I need not say, in self-defence, that I waited as long as I deemed it prudent to do so, but my confidence in her strength was in vain in each instance. In 1841, I delivered her for the third time; but was obliged to use the forceps.

The Perineum.—The resistance of the perineum and vulva is so great, in many women, as seriously to retard the delivery. I have waited six hours by the bedside, after the vertex has begun to jut out between the labia, the patient all the while suffering severe labor pains, which vainly tended to expel the head. In such cases, there is nothing to be done but wait patiently, after having placed the woman's constitution in its proper attitude by means of venesection; by every psychiatric resource of exhortation, assurance, encouragement, and honest promise of relief; by the least fatiguing posture of the body; by the application of mucilaginous fomentations to the genital region; by the exhibition of relaxing drinks, and by the warm bath. I consider that we have no right to apply a force, additional to one strong enough, that nature furnishes, and which it is evident must be effective if left to itself. Under such perverse resistance of the soft parts, time is required to *enable* them to acquire a yielding temper. To force the head through them by the ergot or the forceps, would be to incur the hazard of shocking lacerations of the external organs of generation, or even of the womb itself, which it is rashness, in the highest degree, to stimulate and lash into fury, in cases where the uterine contractions are already very powerful, and where they would soon effect the delivery, were it not that the external parts are unprepared to admit of it. The true principle of practice here is, to diminish the resistance, and not to increase the power, already excessive, and therein dangerous. Let me be fully understood as referring, in the above remarks, only to cases where the energies of the uterus are great and manifest, but yet unequal to the task of overcoming the resistance apidly, and where they evidently will overcome it in a reasonable ime. In other circumstances, as where the resistance is powerful and he pains poor and weak, let the just proportion be established, by eans of the ergot, a glass of wine, or the forceps, between the power nd the resistance it is destined to vanquish.

CASE.—Three years ago, I attended a young woman in labor with er first child. The process was most painful and tedious. The head as fully six hours pressing upon the perineum and external parts, under iolent uterine contractions. The child was at length born, but was ead. As this was a result which I very much feared, I was extremely esirous of applying the forceps. Would it have been justifiable to use hem in a case where the contractions were so strong as to lead me to pprehend that the perineum would give way under every natural pain? thought not. It is perhaps impossible to find expressions fitted justly o set forth the tormenting doubts and anxieties of the accoucheur in ases like this; cases where he feels that he has power to terminate he sufferings of his patient, but dares not violate the injunctions of his onscience, which tells him he may not yet intervene.

When, at last, the head begins to emerge, it does so by pushing away he perineum before it, but which continues to cover the cranium like a ight cap. It should be remembered that the direction of the forces is arallel to the axis of the superior strait; but it is equally true that he direction of the movement is not, at this stage, in the same line; the ead is repelled by the curved line of the sacrum; it is driven against he sacrum; but, coincidently with Carus's curve, *vide* Fig. 23, page 3, glides off from its curved surface towards the outlet; from which, unrestrained by the perineum, it would escape without much extenion. It *has* happened that the head has passed directly through the erineum, perforating it as if a six pound ball had passed through it, ithout injuring the commissure of the vulva, or the sphincter muscle f the anus; and there is supposed always to exist some danger of its earing the anterior edge of the perineum, at least, when that point is nsupported. Hence, the general care of writers to direct that the erineum be supported.

From the foregoing remarks, the Student will be enabled to appreiate the value of this injunction concerning support to the perineum, nd to know how it ought to be executed. He knows that a napkin hould be applied from the lower part of the sacrum up towards the top f the vulva, and be pressed against the parts in such a manner as to rotract or continue the inclined plane of the sacrum, whereby extension of the head will be enforced, and no danger occur of its being too strongly propelled against the now thin tissues, which might be lacerated were the head not to follow the curved line of its movements.

The degree of pressure made by the hand must be proportioned to the exigencies of the particular case. It should always assist the perineum to compel the head to undergo extension; and, where the tissues yield with difficulty, so as to furnish grounds to fear their laceration, the further advance of the head may be safely counteracted, for a time, by firm pressure, and advising the woman to refrain, which she should continue to do until the soft parts acquire a proper dilatability.

The young practitioner, and the Student, should be warned against falling into a habit of beginning too early to support the perineum. If the part should be too early pressed upon with a napkin, it might become heated, and thus lose its disposition to dilate: and it is assuredly not necessary to sustain it, or support it, until so great a degree of extension has taken place as to put it in some danger of being lacerated.

Cord round the Neck.—The head is born: perhaps the cord is turned once, or even thrice around the child's neck, which it encircles so closely as to strangulate it. Let the loop be loosened, by pulling the yielding end of the cord sufficiently to enable it to be cast off over the head. This cannot always be done: if so, in any case, let the child pass through it by slipping it down along its body over the shoulders. If it seems impossible to slip the cord over the head or shoulders either, it should be let alone; and in a great majority of cases it will not prevent the birth from taking place, after which, the cord can be cast off. Should the child seem to be detained by the tightness of the cord, as does rarely happen, or in danger from the compression of its jugular vessels, the funis may be cut with the scissors, and tied after the delivery. Under such a necessity as this, a due respect for one's own reputation should induce him to explain to the bystanders the reasons which rendered so considerable a departure from the ordinary practice indispensable. I have known an accoucheur's capability called harshly in question upon this very point of practice. I never felt it necessary to do it but once.

The Shoulders.—If the shoulders should not rotate, so as to bring one of them under the arch, that motion may be given by one or two fingers, introduced, and made to act upon the shoulder nearest the pubis, so as to draw it into its proper place. If difficulty occur, and der does not advance, press the child back against the edge rineum, and that will often afford room for the advance of lder, which had been thrust over the top of the brim of the the resiliency of the edge of the perineum which is pressed the posterior part of the child's neck, and so pushes the side of the neck against the pubis. I have sometimes caused lders to descend immediately, by merely pressing the peri- nwards and backwards; the shoulder, which was jammed up top of the symphysis pubis, slipping down behind the sym- soon as the cause that pushed it forwards (namely, the pres- e perineum) was withdrawn. Sometimes the shoulder nearest m, and at others that nearest the pubis, escapes first. The will, in practice, readily perceive which one he ought to assist; t times be compelled to try one, and then the other, being which is likely to emerge first.

onsidered bad practice to drag out the body, except in very r circumstances—the womb and abdominal muscles are suffi- owerful for that object; and if it be permitted to come away e shall have a more complete contraction of the womb, and a dy detachment and extrusion of the placenta. Therefore, it to leave the expulsion of the body to nature, merely removing e of delay that may obviate its descent and escape. Where is great, and the child becomes very black in the face, and ration is either not established or in an unpromising condition, lly warranted to expedite the delivery by making use of one fingers, fixed as a blunt crotchet in the axilla.

fter the child is born, the accoucheur should place his hand domen in order to learn the state of the womb.

to treat the Child.—As soon as the child is born, lay it on out of the reach of the waters, which sometimes stand in a dle by the breech of the mother; the child ought never to be to the danger of suffocation.

are not to move it too far; for one should reflect that, by an s sudden movement of the child to a considerable distance, the cord might be violently stretched or even broken. Such an ce might even invert the womb; indeed, it is needful to be ful not to stretch the cord suddenly, either before the sever- ter it.

infant breathes regularly, it is well; if not, blow suddenly into and drop some cold spirit on the region of the diaphragm.

These and a few smart frictions are, in general, all that are demanded. Take care that the infant be not too rudely or suddenly handled. It ought not to be agitated by any violent or hasty motions. In many of the instances, life is already nearly extinct, and so, the child can no more endure to be rudely handled or shaken than can a fainting girl. It is enough to see and know that the child lives—that its heart is beating and its diaphragm moving—for these are the two great motive powers of life. If the diaphragm moves, it pours the oxygen upon the blood—but, oxygeniferous blood sent forward to the brain by the contracting heart extricates the biotic force from the neurine; that force is life made manifest in the motion it excites. The cord should not be cut until the pulsations have ceased near its placental extremity: it would be vain to wait for its cessation near the child's body, as doubtless blood is thrown into the arteries long even after the ligature is applied; in fact, children do sometimes bleed at the cord hours after they have been dressed, if the cord have been imperfectly secured. There is no need to tie the cord twice, unless there be twins; which can always be ascertained by feeling for the uterine tumor. Tie only one ligature, and that at the distance of an inch or two from the belly, and cut the navel-string, holding the cord tightly betwixt the finger and thumb. If it be not held, it will spurt the blood sometimes to a good distance, and soil the bed, or even the practitioner's clothes. Conceal the cut end of the placental portion of the cord in the napkin with which the perineum has been defended, in order that its blood may not fly over the bed; and then, give the child to the nurse. There is danger of dropping the infant if it be not properly taken hold of. It should be seized with the left hand, by one or both ankles; the back of its neck ought to rest in the arch formed by the thumb and forefinger of the accoucheur's right hand, while its back lies in his palm, and the points of the remaining three fingers are under its right axilla. If held in this manner, it can by no means fall to the ground. I have seen a child taken hold of under the arms by both hands, and lifted up in a manner I thought quite insecure, considering that it is slippery with the waters or blood from which it had just been taken up.

Placenta.—In most cases, the placenta comes away in eight or ten minutes—Dr. Hunter thought in twenty minutes. The care required in regard to the placenta is considerable; for no one can say of any labor that it will end well, until the after-birth is completely discharged, and for at least an hour after that consummation. The French call the delivery of the placenta, emphatically, *delivrance*, delivery. We

ght always to ascertain, after having given away the child, what is
e state of the womb. To that end, place a hand on the hypogastrium,
d if a hard tumor be felt there, the womb is contracted; if the womb
either not to be felt at all, or is very soft and yielding, or very large,
few gentle frictions on the abdomen will cause it to contract; and
w if a finger be passed up to the os uteri, the after-birth will be felt
her in it, or just above it; if within it, let the woman bear down imme-
tely, while the cord is tightened, by pulling moderately at it. The
ss will descend slowly into the vagina, either edgewise or not; if not
gewise, one edge may be hooked down with the finger, and a few
orts of bearing down will expel it from the vulva. Remember that
placenta is as large as a dinner-plate, and the cord inserted in its
ddle. The os uteri is contracted to the size of a dollar. To pull
ectly upon such a cord, would be like pulling off a button from your
at, instead of skilfully unbuttoning it. Such a placenta buttoned
thin the orifice, should be dexterously unbuttoned, by bringing its
ge to the button-hole, as you would do with your coat-button.

The placenta should be received in the left hand, and turned or twisted
und several times by the right hand, in order that the membranes
ay be gathered into a string or rope, so that, when they are drawn
t, none of them may be left adhering to the uterine surface, where,
detaining portions of blood, they might give occasion to putrefaction,
th offensive and injurious discharges. A complete, clean delivery
ght always to be effected, if possible. If the woman finds, the next
y, that portions of membrane are hanging out of the vulva, she be-
mes alarmed, or at least thinks her medical man careless or ignorant.
twithstanding that the placenta may be carefully rolled as above
ected, we sometimes find that where the membranes have been very
ch broken by the child, or where they are extremely delicate, the
d or rope we have formed by twisting them, is breaking, so that a
nsiderable remnant of them is about to be left in the uterus, which we
nnot get possession of, without passing up the hand at least into the
gina. My custom, when I find the membranes breaking, is to cease
lling until I have wrapped round my rope of membranes a small rag,
ich enables me to spin them still more and thus draw them entirely
ay. Now they are so slippery that the rope cannot be twisted with
e fingers, but when a dry rag is wrapped round them, we can twine
em, and pull them as much as we may think needful.

Retained Placenta.—It unhappily does not always befall that the
centa comes away so soon: we may wait half an hour or an hour, for

the expulsion of the after-birth, and yet upon examination, repeated from time to time, discover that it has not come within reach of the fingers. Frictions upon the abdomen are known powerfully to excite the peristaltic fibres of the alimentary canal, but their effects upon the womb are far more decided; it may be said, that when made upon the hypogastrium, they generally compel the womb to recommence its contraction—some wombs are so excitable that a touch brings on the after-pains; frictions ought, therefore, to be instituted. The consent of parts, also, causes the womb to act sometimes, as soon as the woman makes a strong bearing-down effort, to which she should be urgently prompted, if needful. When a contraction has been procured by frictions, or in any other way, it may be rendered permanent by pressure; therefore, let an assistant be properly taught to apply the palm of the hand over the uterine globe, and not take it off, until told to do so. Such assistant, however, ought to be one worthy of the trust; an ignorant one might, by pressing at an inconvenient moment, indent the soft and relaxed fundus uteri, and thus cause the beginning of an inversion of the organ. I have no doubt that some of the cases of inversion recited in the books were brought about in this way. In all those patients who habitually flood in labor, this precaution ought to be observed. When the hand is removed, a bandage should be ready to occupy its place. If the os uteri be very much closed, it is probable that the placenta will require a long time to come away; and I know no objection to a patient waiting for the spontaneous movement of the organ, where no hemorrhage, or other unusual appearance, is observed. Some writers have been disposed to assign a fixed period, up to which the accoucheur ought to wait, before he resorts to compulsory measures for the delivery. But there can be, or ought to be, no fixed rule on the subject, except this one rule, namely, the placenta must be got away, as there is no security while it is left. I have never gone away from a patient leaving the placenta undelivered; never. I think I have never waited for its spontaneous extrusion more than an hour and a half, for I have always supposed that if it would not take place in one hour, there was little prospect of its taking place in twenty-four hours. I cheerfully admit, however, that cases may and do occur, in which a longer delay might be advisable. I have not met with such cases. I wish to be understood as speaking, in this place, of the placenta retained *in utero*, and not of cases where it is partly expelled into the vagina; for, when in the vagina, I think there can be no necessity for waiting at all; it ought to be removed at once. Ruysch, the celebrated Dutch anatomist, zealously inculcated the doctrine, that, as the expulsion of the placenta is a natural office, it

ustom of securing the expulsion of the secundines by artificial
res, wherever the powers of nature were incompetent to that end.

urglass Contractions.—As to placenta retained by what is called
lass contractions, I am very confident in the assertion that it is
ys an adherent one. Where the connection of the placenta
uterine surface has, by force of some certain inflammatory action,
e preternaturally firm, the substance of the placenta acts as an
al antagonist to the contraction of that part of the uterus on
it sits. In fact, the placenta may be said to splint the womb,
eep its superficies extended. Now, when all the rest of the womb-
, except those of the placento-uterine region of it, are left with-
ntagonism, they contract as usual, but the antagonized portion
ns extended, splinted by the after-birth, so as to be incapable of
acting like the rest, which, of course, by *their* contraction, shut
lacenta up in a cell, or cavity, which is the upper cavity of the
-mentioned hourglass. I have never seen an hourglass contrac-
rithout adherence of the after-birth; and I take it for granted,
s soon as an hourglass contraction is discovered, there is discovered
with it the indication to deliver, there being no reasonable hope
spontaneous delivery will ever take place. I freely, therefore,
the reader to deliver at once in all cases where the existence of an
lass contraction can be clearly made out. This operation may be
med so as to give no great pain; it requires to be always attended
xplanation of the necessity for it, and assurances of great careful-
nd tenderness in the performance of it. Half the hand should be
ted into the ostium vaginæ first, as far as the thumb, which, being
ried in the palm, permits us to get the whole hand within the
. From thence, either the whole hand, or half the hand, or some-
the index finger alone, may be made to enter the cavity of the
, to detach and seize upon the placenta, which, when fairly severed
unnatural connection to the uterine wall, may be removed by the
or left to be expelled by the contractility of the organ. It is a
afe and proper conduct, however, to bring it away in withdrawing
nd, so as to let the uterus contract as much as possible.

A placenta will weigh from a pound to a pound and a half. Let the Student reflect that such a mass, if within the uterine cavity, must distend it considerably; and if he cannot touch it by passing the finger up to the os tincæ, the fundus of the womb must, of course, be high up within the abdomen. Therefore, in any case of retained placenta, he will find the fundus perhaps fully as high up as the navel. It will require, then, in order to get it, that the *hand* should be introduced: the finger cannot reach far enough.

From the dilated state of the vulva and vagina, after delivery, no difficulty stands in the way of the introduction of the hand into those parts. As it passes up, it is guided by the forefinger, which glides along the cord, while that is tightened by the other hand. The accoucheur must expect to find instances in which the os and cervix uteri actually gripe the cord; and that he will be, in such a case, necessitated to introduce only one finger at first, then a second, and a third, which gradually conquer the resistance of the circular fibres of the os and cervix uteri, so as to make way for the whole hand, which at length is found to have entered into the cavity of the womb. But the pressure required in this operation has put the vagina, even the womb itself, on the stretch; so that were he not to resist its rise by pressing the abdomen with the other hand, the fundus would be pushed up to the scrobiculus cordis, and his arm pass inwards as far as the elbow. He ought not to allow any help, but must, with his *own* left hand on the fundus, force the womb downwards, towards his right hand. In general, it appears to me that the uterus, in retained placenta, contracts by its cervical or lower horizontal fibres, while its longitudinal contraction does not take place at all. It is, indeed, extremely common to feel the womb, like a large intestine, cylindrically contracted as to its transverse diameter, while from the fundus to the os uteri the length is not much less than before the commencement of labor. Certainly it must have happened to many practitioners to make this remark of the cases in which they were obliged to introduce the hand, for the extraction of the placenta. In such instances, the after-birth does not sit absolutely on the vault of the fundus, but is rather on the corpus and fundus. Let the operator always stop the womb from rising, by counteracting it with one hand placed on the abdomen, over the top of the fundus, in order to push it downwards towards the hand which is within. Most probably the placenta is to be found wholly or partially attached; if so, let the detachment be effected, taking great care not to use sudden and indiscreet force, so as to hazard the leaving any of its lobuli in the cavity. Whenever all the adhesions are certainly overcome, the ould be grasped in the hand, which may then be gradually withholding the obnoxious placenta in its palm; or, if the womb is d to push the hand out, so much the better. This operation it en my fortune to be compelled to perform a good many times; an safely say I have never seen any bad results from the prac- I repeat, it may be done so gently and dexterously, as even to n but little pain. One patient only for whom I have performed rvice has died.

n the last portions of the child quit the uterine cavity, being d by the muscles of the organ, it generally happens that the a is completely detached from the uterine wall by that same tion. This, however, is far from being always the case. When mb does not displace the placenta by the force of the last ex- effort, it does not follow that we are to expect an hourglass tion. On the contrary, the hourglass is a rare event, while the ed normal adherence, total or partial, is a common one, the par- ing more common than the total adherence. Yet it is probably at an hourglass would ultimately shut the placenta in its upper all cases where the placenta should fail to quit the surface after contractions. If, in such a case, there be no flooding or other ms indicating our intervention, we ought to wait for one hour t. It is not wise, I think, to wait longer, and my multiplied nces teach me that it is not rash then to proceed to the delivery secundines. To do so, the whole or part of the hand must be upwards, so as to reach and peel off the placenta.

cord furnishes a most convenient means of pulling out the ta, but should never be used for that purpose without a very l reflection on all the circumstances. If the after-birth is still ed, and the uterus firm, to pull at the cord is to endanger the ng it off even with the surface, which is an embarrassing and disgraceful accident; but if the womb be not firmly contracted, flaccid, that, like a wet bladder, it may be turned inside out. seen a womb that was turned inside out by a midwife in this case of great interest, that will form the subject of a future To any individual who has seen a womb at full term, nothing seem to be easier than to invert a relaxed uterus. Wherefore, n of discretion ought to draw by the umbilical cord, without first ascertained that the womb is well contracted; and even the force he may venture to employ by its means is an exceed- limited one.

Womb after Delivery.—When the placenta is delivered, the hand should be again placed on the patient's hypogastrium, for the purpose of ascertaining whether the uterine globe is firm. If one forgets to do this, he will incur the dreadful hazard of leaving his patient with an inverted womb. This lately happened here to a friend of mine, who did not discover the accident until five weeks after the event. The woman suffered the greatest distress, and the greatest weakness from loss of blood, but recovered at last.

The uterus ought, through the integuments, to feel about as large as the fist; but there is great diversity in regard to the magnitude of the organ immediately subsequent to delivery. The smaller it is, the better for the patient, who, with a well contracted uterine globe, may be safely pronounced beyond the reach of danger from effusions of blood; or at least, from effusions that can with propriety be denominated uterine hemorrhages.

In feeling for the globe of the womb, whether before or after the delivery of the placenta, we should always endeavor to ascertain that the fundus has not fallen in, making a deep concavity like that in the bottom of a junk bottle. Such an indentation is the first beginnings of inversion of the womb, and it may readily be detected where the belly is loose, thin, and flabby. If, in any case, such an indentation should be discovered, the rule of practice ought to be to introduce the hand and take the placenta bodily away, or pushing the incipient inversion of the fundus back to its place, forbidding the woman, meanwhile, to make even the least expulsive effort. After the extraction of the after-birth, great care should be invariably used to make sure that the proper orbicular form of the organ is preserved.

After-pains.—Inasmuch as the pains of labor alternate with intervals of uterine rest or inaction, it follows that the pains which women suffer, whether before or after delivery, depend upon one and the same cause, namely, the muscular action of the womb. The organ, after delivery, grows alternately small and large for some hours; expanding to double the size of the fist when the pains are off, and reducing itself to the smallest size when they return. Every interval, or moment of expansion, permits a small quantity of blood to accumulate in the cavity, which is forced out by the returning pains. The woman feels the gush of warm fluid issuing from the vulva, and is very apt to say that she is flooding or flowing. An inspection of the countenance and an examination of the pulse are perhaps sufficient to indicate the course of the practitioner. If the face is not pale, and the pulse not weak or small, he will be sure she is not bleeding too freely; but if they indicate the existence of too considerable a discharge, the amount of it ought to be ascertained with the most rigorous precision. There are few nurses who are competent to decide upon the nature of the discharge; as whether it amounts to what might be denominated hemorrhage or not. I was called in haste to attend a woman whom I found just delivered of a child; I received the after-birth, which came off spontaneously, and observed that the sanguine discharge was very great, but the woman, although feeble, was not sunken. The uterus contracted well, and I left her in a comfortable and usual state. In about two hours I was summoned again, and found her very faint, with extremely feeble, slow pulse. Placing one hand upon the hypogastrium, I found the womb not dilated, and then inquired of the nurse as to the amount of the lochia. She assured me that it was not greater than it should be. She had examined carefully into the circumstances, and found all right. Distrusting her account, I determined to learn for myself whether a large effusion had taken place, and found an immense quantity of coagula lying upon the bed, which the nurse had either not seen at all, or disregarded. This case, which many years ago caused me great trouble and anxiety, has influenced me ever since, and now I always feel unwilling to take information at second hand upon the important subject of profuse uterine discharges. I think it the duty of the Student early to resolve to learn accurately whatever may have an injurious or dangerous tendency for the patient committed to his charge.

Hemorrhage.—It may be stated as an axiom in obstetrics, which has almost no exception, that a well-contracted uterus cannot bleed; and all obstetricians habitually feel secure when they find the organ hard, and of a small size. Nevertheless, the state of contraction may soon be followed by so absolute a relaxation of the contractile fibres of the uterus, that the gentlest infusion of blood into its cavity shall distend it again, if that fluid be prevented from escaping at the os tincæ or at the vulva. But if a coagulum should fill the vagina, or stop the mouth of the womb, or if the napkin should be too strictly pressed against the genital fissure, preventing the escape of fluid therefrom, the blood which flows into the womb will gradually distend it to that degree, that, without losing a spoonful externally, the woman may effuse enough blood into the uterine cavity to expand it very greatly, and so cause fatal syncope.

CASE.—I was called, about three years ago, into the country, to assist a practitioner in a difficult labor. When I arrived, the child had just been delivered with forceps. The placenta was adherent. After waiting a sufficient length of time for its spontaneous extrusion, I removed it, and the womb contracted well. In the course of half an hour, my attention was attracted by a sort of gurgling sound from the bed, which caused me to draw near to the woman, whom I found already quite fainted away when I approached her. She was very pale, and the pulse could not be felt at the wrist. The discharge was inconsiderable; but, on placing the hand on the hypogastrium, the womb was found enormously distended, and full of blood. Two fingers were now carried into the os uteri, which was completely tamponed with a very firm clot. This I broke up and brought away, when out rushed a large quantity of grumes, mixed with fluid blood, and the womb returned to its proper dimensions. She had no return of the symptoms.

I could cite many examples from my case book, of violent hemorrhages, both concealed and open, which have fallen under my notice in females where the uterus had contracted perfectly well after the delivery of the placenta. One case is so remarkable that I cannot resist the inclination to publish it here.

CASE.—Mrs. S. was delivered of her first child after an easy labor. She had a very good getting up, and on the fifteenth day walked down stairs. Some words of an unpleasant character passed between her and her husband. She became violently excited with anger; then burst into tears, and ran up stairs, where she threw herself on the bed. She was shortly afterwards found in an apparently dying state. When I reached the house, there was no pulse—great coldness, and the greatest degree of paleness. I found the womb filled with blood, and reaching above the umbilicus. Dr. Dewees was so kind as to visit this patient with me, and assist me with his valuable counsel. She recovered, but suffered a long time under the symptoms produced by this excessive sanguine discharge. This case will show the Student that even where the uterus has contracted so much as to sink down below the superior strait, it may be afterwards enormously distended by influent blood; and the reflection arising from it, though an unpleasant one, is a very just one, that, even where we succeed in getting a good contraction, we can have no sense of absolute security against concealed or open hemorrhage, in a patient whom we may have put to bed ever so comfortable and apparently safe.

The influence of position in determining the momentum of blood in the vessels is well known to the profession; but there are few cases wherein it is of more consequence to pay a profound regard to this influence, than in parturient women. A uterus may be a good deal relaxed or atonic, and yet not bleed, if the woman lie still, with the head low; whereas, upon sitting up suddenly, such is the rush of blood down the column of the aorta, the hypogastrics, and the uterine and spermatic arteries, that the resistance afforded by a feeble contraction is instantly overthrown, and volumes of blood escape into the womb and vagina with almost unrestrained impetuosity. The vessels of the brain under such circumstances become rapidly drained, and the patient falls back in a state of syncope, which now and then proves immediately fatal. I may be excused for stating here that I have never met with but one of these sudden and fatal hemorrhages in my own practice. It is, perhaps, due to the special attention I have always considered it a duty to pay to this point, that I have hitherto avoided so serious a misfortune. Surely, I have, in a multitude of persons, by a prompt attention to the state of the womb, turned aside the stroke of death by proceeding without delay to empty the organ by turning out of its cavity with my fingers the masses of coagula with which it was filled. If you leave your patient soon after her deliverance, and are hastily recalled to see her with an announcement perhaps that she is dying, your first duty on reaching her bedside is to examine the hypogaster in order to ascertain if the uterus be firmly contracted or not, and, if you find that the uterine globe is not too large, too much distended or expanded, then do not rest satisfied until by a vaginal examination you shall have learned that there is or is not a clot-tampon in the vagina.

CASE.—In conversation with my late venerable friend Professor James, upon this very subject, he informed me that he delivered a lady a few years before, after an easy natural labor. The uterus contracted well, and all things seemed as favorable as possible. As the accouchement took place early in the morning, he was, subsequent to the event, invited to breakfast down stairs, whither he proceeded, after having given strict caution to the lady on the subject of getting up. While the persons at breakfast were conversing cheerfully, and exchanging felicitations upon the fortunate issue of affairs in the lying-in room, the nurse was heard screaming from the top of the stairs, "Doctor, doctor, for God's sake come up!" He hastened to the apartment, and the lady was lying across the bed quite dead. It was found that, soon after the doctor went below, the lady said to the nurse, "I want to get up."

"But you must not get up, madam; the doctor gave a very strict charge against it," replied the nurse. "I do not care what the doctor says," rejoined the patient; and thereupon arose, and throwing her feet out of the bed, she sat on the side a few moments, reeled, and fell back in a fatal fainting fit. The remarks of Dr. James, as he related the occurrence to me, made upon my mind a deep impression of the vast consequence of careful and well-timed instruction of the nurses; who, if they could have the dangers of mismanagement fully exposed to them, would surely avoid some accidents that every now and then are attended with shocking results.

Large discharges are not apt to occur when the womb has once contracted pretty firmly. But there are precautions which ought always to be observed: for example:—

CASE.—I left a woman half an hour after the birth of her child. She was as well as could be desired. I gave the usual directions. In a short time her husband came running to me, in the street, where he met me, and said his wife was dying. Upon hastening to his house, I found her, in fact, pulseless, pale, and completely delirious, with a constant muttering of incoherent phrases. Upon inquiry, the following occurrences were found to have taken place. She felt some desire to pass the urine. The nurse told her to get up. "But the doctor says I must not get up." "Oh, never mind what the doctor says; it won't hurt you; get up." A chamber-pot was placed in the bed, and Mrs. F. was lifted upon it, in a sitting posture. She fainted in the woman's arms, was held up a short while, and when laid down, the vessel was discovered to be half full of blood. She had nearly died; and did suffer long and severely in consequence of this imprudent disregard of orders. When I left her, the uterus was well contracted; but the change of momentum in the arterial columns produced the hemorrhage, than which I have scarcely seen one more dangerous.

CASE.—It is of the highest consequence to secure a firm contraction of the womb after delivery, in all those women who have suffered severely from floodings, occurring soon after the birth of the child. A lady in three successive labors, of which the first occurred on the 30th of December, 1819, and the last on the 28th of September, 1824, which were rapid and easy, was brought almost to the gates of death by enormous discharges, which commenced about five minutes after the birth of the fœtus. I saw her lie pulseless, and as near as possible to dissolution in those labors. In two subsequent confinements, she took one scruple of ergot, just as the fœtal head began to emerge. This was given to her, not for the purpose of aiding in the expulsion of the child, or placenta, which had never occasioned any embarrassment in antecedent labors; but, by constringing the womb permanently, to save her from those dangerous losses; and I am pleased to say that, in both instances, she experienced none beyond the ordinary amount of effusion. I could cite very numerous examples of similar results. I scarcely ever omit such a precaution for any patient, of whom I am informed that she floods after delivery.

Sitting up too soon.—As regards the danger of sitting up soon after delivery, there are some important suggestions for the Student that ought not to be here omitted.

Certain women are met with who pass through the conflict of parturition unscathed, and who are quite as competent to the performance of their daily toil on the following day as the Chief's wife who so much excited the astonishment of Hearne on his Northern Journey. I have found that many of my patients, and some in the class of what are called the "upper ten thousand," were completely destitute of all symptoms of indisposition as the halest Potawattomie or Ottowa woman. Such people might get up; and I have seen very elegant women get up and "be about" on the third day without pretence of after indisposition. Still, it is a safe rule to advise the keeping of the bed for many days, since to leave the bed is to go forth *à la chasse* for some malady. Hemorrhages, chill, prolapsions, and an evil train attend those imprudent women who leave the lying-in couch too early. A rest of nine days is a short rest after nine months of fatigue crowned by the exhausting conflict of a labor.

But it was not merely to the treatment of the ordinary cases that I designed to call the attention of the Student. My warning is directed against the mismanagement of those women who have lost too much blood in the parturition, and particularly to such as have lost a *great* quantity.

It is well known that the coagulability of the blood is greater in proportion as any hemorrhage progresses—therefore a woman who has lost during her labor forty or eighty ounces of blood has the rest of it more coagulable than it was before the flooding commenced. *Again,* fainting consists in the too little intensity of the pressure of the blood in the brain capillaries—and a woman just gone through a flooding experiences a sensation of faintness from lessened vascular tension of her encephalon. If she suddenly assume an erect position, the tension becomes *instantly* lessened in consequence of the gravitation of the blood. But—and this is the danger—if she faint badly while her blood is become thin and highly coagulable from hemorrhage—the scarcely moving current partially stops in the heart, and when she comes out of the deliquium, she sometimes does so with a clot in the auricle and ventricle —she has got a false polypus in the heart—and she will surely die.

Heart-Clot.—Many women have died soon, almost immediately after giving birth to the child; or speedily after the delivery of the placenta. Some of them have perished suddenly upon rising up in bed, within a day or two, or more, after a labor attended with hemorrhage, from which, however, they were then so far recovered as to give no apparent cause for anxiety about them.

The examination of the body by the anatomist has in such instances detected no cause for the sudden dissolution, and the case has remained shrouded in mystery. I venture to believe that such cases have been rendered less mysterious, since the observations I published in the *Phila. Med. Examiner*, No. 51, for the month of March, 1849, and which has attracted a share of the attention of my brethren. In order to show how mysterious such cases have heretofore been, I shall cite, in this place, a letter from Dr. John Sims to the late Dr. Joseph Clarke of London.

This interesting communication is printed at page 68 of a short sketch of the life and writings of the late Joseph Clarke, Esq., M. D., &c. &c., formerly master of the Dublin Lying-in Hospital, by his son-in-law Dr. Robert Collins, author of the celebrated work on Midwifery. I wish the Student to read Dr. Sims's letter with care, and then reflect upon the question, whether the Princess probably died from hemorrhage from the womb, or whether she died from the sudden filling up of the pulmonary auricle and ventricle with a mass of coagulated blood, which as effectually cut off the venous circle, as it would have been cut off by a ligature cast about the vena cava and drawn almost tight. Can he account for the restlessness, disturbed respiration, and peculiar action of the heart, as well as effusion into the pericardium, on any other hypothesis?

Dr. Collins says that this letter "contains a clear and concise history of the case of the ever deeply lamented Princess Charlotte," and is the only authenticated account that has been published.

"LONDON, *November* 15, 1817.

"MY DEAR SIR: I do not wonder at your wishing to have a correct statement of the labor of Her Royal Highness, Princess Charlotte, the fatal issue of which has involved the whole nation in distress. You must excuse my being very concise, as I have been and am very much hurried. I take the opportunity of writing this in a lying-in chamber.

"Her Royal Highness's labor commenced by the discharge of the liquor amnii about 7 o'clock on Monday evening, and pains followed soon after; they continued through the night and a great part of the next day, sharp, short, but very ineffectual. Towards the evening, Sir Richard Croft began to suspect that the labor might not terminate without artificial assistance, and a message was dispatched for me. I arrived at two on Wednesday morning. The labor was now advancing more favorably, and both Dr. Baillie and myself concurred in the opinion that it would not be advisable to inform Her Royal Highness of my arrival. From this time to the end of the labor, the progress was uniform, though very slow, the patient in good spirits, pulse calm, and there never was room to entertain a question about the use of instruments. About six in the afternoon, the discharges became of a green color, which led to a suspicion that the child might be dead; still, the giving assistance was quite out of the question, as the pains now became more effectual, and the labor proceeded regularly, though slowly. The child was born, without artificial assistance, at 9 o'clock in the evening. Attempts were for a good while made to reanimate it by inflating the lungs, friction, hot bath, &c., but without effect; the heart could not be made to beat even once. Soon after the delivery, Sir Richard Croft discovered that the uterus was contracted in the middle, in the hourglass form, and, as some hemorrhage commenced, it was agreed that the placenta should be brought away by introducing the hand. This was done about half an hour after the delivery of the child, with more ease and less loss of blood than usual. Her Royal Highness continued well for about two hours; she then complained of being sick at stomach, and of noise in her ears; began to be talkative, and her pulse became frequent, but I understand she was very quiet after this, and her pulse calm. About half-past 12 o'clock, she complained of severe pain at her chest, became extremely restless, with a rapid, irregular, and weak pulse. At this time I saw her for the first time, and saw immediately that she must die. It has been said we were all gone to bed, but that is not a fact. Croft did not leave the room, Dr. Baillie retired about eleven, and I went to my bedchamber and laid down in my clothes at twelve. By dissection, some bloody fluid (two ounces) was found in the pericardium, supposed to be thrown out in *articulo mortis.* The brain and other organs all sound except the right ovarium, which was distended into a cyst, the size of a hen's egg; the hourglass contraction of the uterus still visible; a considerable quantity of blood in the cavity of the uterus; but those present differ about the quantity, so much as from 12 ounces to a pound and a half; the uterus extending as high as the navel. The cause of Her Royal Highness's death is certainly somewhat obscure; the symptoms were such as attend death from hemorrhage, but the loss of blood did not appear to be sufficient to account for a fatal issue. It is possible that the effusion into the pericardium took place earlier than what was supposed, and it does not seem to me to be quite certain that this might not be the cause. As far as I can judge, the labor could not have been better managed. That I did not see Her Royal Highness more early was awkward; and it would have been better that I should have been introduced before the labor was expected; and it should have been understood that when the labor came on I should be sent to without waiting to know whether a consultation was necessary or not. I thought so at the time, but I could not propose such an arrangement to Croft. But this is entirely *entre nous.*

"I am glad to hear that your son is well, and, with all my family, wish to be remembered to him; we were happy to hear that he was agreeably married.

"I remain, my dear Doctor,
"Ever yours, most truly,
"JNO. SIMS.

"P. S. This letter is confidential, as, perhaps, I might be blamed for writing any particulars without the permission of Prince Leopold."

I shall seize the present occasion to present again the views that I made public through the *Philadelphia Medical Examiner* for March, 1849, on the subject of sudden coagulation of the blood in the heart. My paper, above alluded to, was entitled the *Heart-Clot;* and, notwithstanding it was known that fibrinous coagula are sometimes found in the heart, I conceive that the views presented by me as to the *heart-clot* in Midwifery practice, are both novel and important. Hence, I am desirous to record them in this work.

Inasmuch as the life of the blood is intimately connected with that of the vessels in which it exists and circulates, it seems reasonable to infer that the vigor and activity of the vital force in the former, bear a certain ratio to that of the latter.

It is a fact beyond cavil, that, in an animal slowly bled to death, the first portions of blood extravasated require a longer time to coagulate than the last effused portions; and hence it is to be assumed that the coagulability of the blood left within the vessels after great hemorrhages is positively augmented. I have had several occasions to suppose it to be *dangerously* augmented.

Exhausting hemorrhages act directly to produce weakness—not of the muscular system only, but of the whole of the organisms. If the vitality of the blood depends upon that of the vessels, such universal debility or lessened innervation must also implicate the life-force of the vessels, and so of the blood itself. To withdraw this vascular life, or to lessen it dangerously, is to allow the blood to coagulate, or to give it a propensity to coagulate. When the blood loses its vital connection with the nervous mass of the animal, it dies, and its coagulation—complete coagulation—is the complete death of the blood.

A woman, who in a hemorrhagic labor has been so reduced by losses of blood as to be regarded as in a precarious situation, is exposed to danger, chiefly from the excessive coagulability of the blood remaining and circulating within its vessels. If such a patient should rise up suddenly in bed, the recent loss of blood, and the weakness consequent thereto, render her liable to a fainting fit, during the existence of which the radial pulses cease; and the impetus of the heart can scarcely be discerned by auscultation.

This very state is but an extreme though transitory aggravation of the before existing universal debility: she lies motionless and half exanimate; the respiration scarcely proceeds; the temperature falls; the sight, hearing, and consciousness are suspended; the action of the heart is so feeble and slow that one may well doubt if it will ever again be re-established.

Such a condition cannot but dangerously augment the tendency of the blood to clot, or die. Nor should we be surprised to find that the patient has suddenly expired, because she was not able to set the heart in motion again—its right auricle and ventricle and its pulmonary artery having, during the stasis, become filled with a clot moulded upon those cavities.

But the formation of a heart-clot does not always prevent the heart from resuming its systolic and diastolic activity; and, indeed, the heart may recover, and continue to carry on a disturbed circulation for a series of days, or even years, though there remains no hope that such a person shall ever thereafter enjoy good health.

The recovery, or rather the partial recovery, will depend upon the size of the clot formed during the state of fainting. A clot that should quite fill the whole cavities must preclude the possibility of any recovery; whereas, a smaller one would not prevent the blood of the cavæ from entering into and being expelled from the heart, but with a difficulty and imperfection relative to the magnitude of the clot. In the case of the Princess Charlotte, whose death within a few hours after the birth of the child cast a gloom over the whole British empire, there is reason to believe that a clot in the heart brought her existence to an almost instant close.

I believe that few persons die with scarlet-fever, or smallpox, or consumption, who are not hurried to the grave by means of coagula formed in the heart, late in the progress of the cases, in consequence of the debilitation or lessening of that inducted-life that passes from the vessel to the living blood. I have many times, in the closing scenes of pulmonary consumption, and other lingering, and some acute maladies, perceived, from the *running* and fluttering pulse, and the augmented respiratory distress, that the last fatal blow was struck by the formation of a heart-clot of greater or less size.

But these coagulations, that ordinarily take place in the last days of lingering chronical disorders, are different from the sudden and blasting power of the same accident in our midwifery practice.

I cannot doubt that the lady whose case I have related as having been under Dr. James's care, must have died from the coagulation of the blood in her heart. A mere deliquium is recovered from very soon after the body is placed in a horizontal posture. I should think that a fainting fit could hardly prove fatal *per se;* but, if a heart-clot should be formed during the deliquium, it seems unlikely that the blood could again move in its circle. No examination was made of the dead body of Dr. James's patient. No one knew anything of sudden heart-clot. She did not die with hemorrhage. What was it that destroyed her life? what could have destroyed it so suddenly, save a deliquium, during which the heart filled with a solid clot, that precluded the possibility of re-establishing the circulation, the oxygenation, and the innervation of the unfortunate lady?

Bichat has taught us the important truth, that man cannot die, save by the cessation of life or power in the lungs, or in the heart, or in the brain. By lungs, he means oxygenation of the living mass. By heart, he means sanguine circulation; and by brain, he means the nervous mass, particularly the nervous mass of the medulla oblongata, in which essentially resides the innervative force of the respiration, and so, the oxygenating force. Man must, therefore, die by the brain, the heart, or the lungs. It is to the last degree improbable that Dr. James's patient died *solely* because her brain ceased to evolve nervous force; but, if it did not instantly cease to do so, it must have continued to be the cause of some motion, everywhere within. But if, as I suppose, the heart became instantly filled with an immovable clot, so that it could no longer receive nor discharge any blood, the nervous mass would die as soon as the last remaining atoms of oxygen in its capillaries should have become exhausted. The function of the capillaries is to take the oxygen out of the blood and convert it into venous or black blood. Dr. James's patient died by the heart, as do all those who have the misfortune to form a heart-clot of considerable size.

I have had the unhappiness to witness several fatal terminations of puerperal eclampsia. In the paroxysms of this sort of convulsion, the patient's face ordinarily grows darker and darker, and the tongue and lips blacker and blacker, as the paroxysm goes on, until the pulse almost ceases to be felt, the respiration becomes much suspended, and at last the patient lies still. This scene, at the greatest height of the struggle betwixt life and death, is one of approaching asphyxiation; the innervations have become so reduced that the physician is led to look with an anxious eye to see whether or not life has become wholly extinct.

If death does not supervene, there comes a slow recuperation of the forces. Now, if the patient rises upon her elbow, or attempts to escape from the bed (and it is sometimes very difficult to hold her down); if she stares wildly about her and breathes with difficulty or violence, she will surely die; and that, because, during the extremest intensity of the late asphyxiation, a soft clot has filled the right auricle, ventricle, and pulmonary artery.

I have not seen such a patient, so struggling and so breathing, escape from the fatal termination. Indeed, it would be difficult, *à priori*, to imagine a condition more likely to lead to the heart-clot than that of a woman in a violent eclampsia, especially if an unmeasured use of venesection should have been employed. A lady was confined, and with a natural labor, giving birth to a healthy child at term. She had lost a good deal of blood with the expulsion of the placenta, which left her weak and pallid. The physician directed her to be kept quiet, so that she had a good day and following night. On the following morning the physician found her in all respects as well as could be wished.

Very soon after he had withdrawn from her chamber, she became alarmingly ill, and he was sent for and returned, having been absent about one hour. The pulse was now extremely frequent, weak, and small, and it continued so until her death, which took place on the 18th or 19th day. It was upon the 18th day that I was invited to the consultation, and at once formed the opinion that she had a heart-clot, as the cause of all her dreadful symptoms, and which, acting as a tampon of the heart, deranged the circulation, respiration, and innervations of the dying lady. After her decease, which occurred the next morning, a white, fibrinous coagulum was found in the right auricle, nearly filling it and projecting through the tricuspid valve into the right ventricle, the tail of the clot whipped into cords by the threshing action of the chordæ tendineæ of the ventricle. The pleura of the right cavity contained a large quantity of serum.

When the physician left his patient's chamber on the morning of the attack, she was well enough; when he returned, after an absence of only one hour, he found her alarmingly ill. She had lost blood in the labor. He had no sooner gone than the nurse took her up, and sat her upon a vessel in bed to pass the urine. She fainted; the blood coagulated in her heart. She did not die outright, but carried on an imperfect circulation outside of the clot, and betwixt it and the walls of the heart. The red matter of the blood was gradually squeezed out from the clot and hurried into the pulmonary artery, together with numerous fragments of the remaining mass of immovable fibrine. Such concrete elements of the blood could not possibly pass through the pulmonic capillaries; whence there arose pulmonary obstructions, pneumonia, pleuritis, and hydrothorax, as the last consequences of the heart-clot. So that she died about the 19th day.

Towards the end of the year 1848, a primipara gave birth to her child. She was a tall, slender, and very delicate woman. The placenta was not removed. She lost a good deal of blood; probably a large quantity. Between forty and fifty hours after the birth of the child, I was called in, and removed the placenta from the grasp of the cervix, which alone detained it. It was so putrid that the stench of it could not be removed from my hand, by any means that I could employ, for full twenty-four hours. She was pale, and her pulse was somewhat frequent, but not enough so to annoy me. The next day I found her *comfortable;* the milk had come, and she was doing well, though very pale. On the seventh day she was put into a chair and set before the fire. Immediately she fell sick, was put to bed very ill, and I being hastily called, told her friends that she had formed a heart-clot, because she had been imprudently taken out of bed, set up, and thus made to faint. In that fainting fit the blood lost the vital induction, and coagulated as it died. She died, as any woman may be expected to do who is so treated, under such circumstances of debility and exhaustion.

The state of fainting, is one that I consider to be dependent always upon oligæmia of the encephalon; for, whenever the vascular tension of the parts contained within the skull is suddenly and considerably diminished, from what cause soever, faintness comes on, and the individual seeks for or falls into an horizontal posture, in order to restore the plenitude of the brain-capillaries. I can form no conception of a fainting fit occurring during the existence of an encephalic hyperæmia. To raise a woman up, who within a few days past has sustained a great loss of blood, is almost inevitably to bring on a deliquium animi. Now, if the opinion be a sound one, and I believe that it is so, that precedent losses of blood increase the tendency of that fluid to coagulate, it follows that, to take a woman under such circumstances out of her bed, and make her sit up, is to expose her to the risk of forming a heart-clot that shall instantly manifest its presence by a wild feeling of suffocation and all the distressing manifestations of an insupportable asphyxia. Often, very often, such a heart-clot is immediately fatal—the patient dying as suddenly as if a grape-shot, instead of a clot, were lodged in one of the pulmonary auricles or ventricles.

Monthly nurses, and the ordinary companions of the sick, like the public at large, know nothing of these things; which yet are so plain and so undeniable, that at least every Student of Medicine ought to be concisely acquainted with them.

Let me recommend the perusal of the following interesting case to the Student. The facts as they occurred were intensely interesting to me—and I wish that I were possessed of some art of picture-writing by means of which to reproduce the scene before the mind of the reader; and that he might see it in all its force as I did at the time of its occurrence.

Case.—A lady, the mother of four children, after having been considerably excited by certain circumstances in her domestic relations, was attacked with symptoms of labor in the afternoon. She sat all night in an arm-chair, and did not sleep even for a moment. At 5 A. M. she placed herself upon the bed, and the child was born in half an hour. The placenta came off well, and nothing was left in the womb, which was found firmly condensed. In the course of an hour after this, she was seized with a copious hemorrhage. The vagina and womb contained large coagula, that were turned out by the physician, upon which the hemorrhage ceased, and she was pretty well, although she had lost by estimate some thirty ounces. The accoucheur remained near his patient from half past six, when the hemorrhage ceased, until after 10 A. M., and then bade her good morning, and left her *very well.* At midday, and throughout the following night, she continued very well. At half past nine on the next morning, at his visit, he found her as well as could be wished, having no pain nor any appreciable indisposition save those symptoms appertaining to a healthy *accouchée.* The pulse was about 75; she was quite well.

The physician took his leave of her at 10 in the morning.

Being summoned to her, he came to her chamber again at 1 o'clock, and found her apparently nigh unto death: the pulse 164, feeble and thread-like; the hands cold; and the respiration, repeated with long intervals, seemed to depend solely on the exertion of the will. The respiratory acts were performed with great violence, and without rhythm; she had lost no more blood, for there was no coagulum either in the womb or vagina.

The physician, it was Dr. Yardley, requested me to visit with him, and I arrived at 3 P. M. She supposed herself to be moribund; and still breathing, solely by her will, and without organic rhythm, asked me, a stranger, with words broken by the occasional forced aspirations, "Sir,—do you—think—I shall be—alive—in half an hour?"

It would be difficult to conceive of a greater physical distress than that which was now endured by the dying lady. Every respiratory act was attended with an agonizing sense, and with pain at the end of the sternum, as in angina pectoris. I ausculted the heart and the lungs, and sought by percussion to discover the state of the lungs and pericardium. I could detect nothing to explain the curious phenomena. I examined the abdomen, and employed the Touch to explore the pelvis. I was informed that she sat up in bed to make water, soon after the Doctor had left her at 10 o'clock, and that she was immediately thereupon seized with this illness. At once, I perceived that the deliquium had allowed a clot to form in the heart, and that it must prove as fatal as it would if a bullet instead of a coagulum was lodged there. Indeed, I could not come to any other conclusion, for I said, at 10 o'clock she had 75 pulsations, at 1 o'clock, 165 pulsations. There is no pathological principle could bring about so sudden and great a change in the pulse, the respiration, and temperature, except some mechanical obstruction, such as a clot or tampon filling up the heart.

Such a clot, occupying the auricle, ventricle, and pulmonary artery, can never be taken away. Its influence on the circulation is equal to that which would be exerted by ligation of the cava, leaving only a small aperture for the transmission of a very little blood to the lungs. This lady is not dead already, because she still urges a very little blood onwards to the lungs, and which finds its way betwixt the coagulum and the walls of the heart. But the quantity thus propelled is insufficient to take up an amount of oxygen equal to the demands of the nervous system, and hence, she makes these violent and voluntary efforts to breathe, and obviate the asphyxiation. Her *instinct*, not her knowledge, teaches her that the more perfectly she can oxygenate, even the small stream that still remains to her, the less will she perceive the sensations arising from her cyanosis, or approaching complete state of asphyxia.

I thought it might be possible to restore the organic rhythm of her respiration, at least for a short time; and that, if that could be done, she would be greatly comforted by it. Hence, I stood before her and asked her to look at me, and exactly imitate the acts of respiration I was about to perform before her.

Accordingly, she fixed her eyes upon me, while I, by a forced aspiration, inhaled perhaps 100 cube-inches of air, which she did in like manner; I then repeated the aspiration, which she also did for more than a minute, when I ceased; she now breathed with rhythm and without the intervention of her will; in short, she was greatly comforted, and had not from that time until her death any more of the purely voluntary respirations that constituted the most shocking spectacle of the whole scene of her sufferings.

Let the Student consider what must be the result of such a mechanical obstruction in the heart, as this I have here supposed. The systemic auricle and ventricle and aorta are unaffected, at least directly; nothing prevents the easy out-flowing of their blood; nothing prevents the circulation from flowing in on the cœliac and the mesenteric arteries; but the capillaries in which they terminate can no longer deliver over all the blood they receive, because the clot in the heart is equivalent to a ligation of the inferior cava. It is to be expected, therefore, if the patient should survive for a few hours or days, that the aqueous elements of the blood must largely escape, by exosmose or otherwise, from the mesenteric and intestinal capillaries, and fill the peritoneum with water. In one of the cases I have herein related, the pleura was filled; because, I suppose, the minute fragments of the concreted blood had been driven into the lung-capillaries, and so caused the hydrothorax through a pulmonary obstruction. Here, when the fibrinous clot was unbroken, the effusion fell into the peritoneal sac; and the clot must have acted as a complete tampon, since not only were both the pulmonic cavities quite full, but the clot also extended far within the pulmonary artery itself. Twenty-four hours after her death, which took place some thirty hours subsequent to the occurrence of the accident, I found both the right auricle and ventricle, as well as the pulmonary artery, filled with a whitish-yellow, chicken-fat colored coagulum. One might well feel surprised to find that such an obstruction should not have proved instantly fatal. Let the Student here observe that the clot was not one of those dark euthanasial coagula, that are commonly met with in the heart, when examined after death from ordinary causes. Had it been even a firm but dark clot, I should have concluded that it was formed during the moribund state of the subject. On the contrary, whenever the clot consists chiefly of the fibrinous portion, and is of a yellowish, chicken-fat hue, it must be assumed to have been formed a considerable time before the death-struggle of the patient. Its whitish-yellow tint proves that the red matter had been long before completely pressed out of and separated from the fibrine. These coagula have been called false polypi of the heart.

I have had so considerable an experience in these matters, that I could relate, in this place, many other instances of persons in whom heart-clot was suddenly formed, but I must abstain for want of space for such remarks in the present volume. Besides, I am content with having, in the foregoing, called the attention and excited the reflection of the Student, as to the case, and with having put him upon his guard against the most real and perhaps only danger connected with deliquium animi. After having read these remarks, I venture to hope that, in all cases of dangerous uterine or other hemorrhage, he will not be so blind to the circumstances, as to allow his patient to be taken out of the horizontal posture until he shall have become well assured, that a deliquium animi cannot come on to arrest the movement of the blood in the pulmonic heart, so as fatally and instantly to fill the cavities with this heart-clot. Several authors have spoken of heart-clot; but I am not aware that any one has heretofore set the case in such a light as that in which I have attempted to place it. There is a very clever *resumé* of the subject now before me in a pamphlet which was an inaugural dissertation *de Polypis Cordis*, &c. &c., presented at Halle in 1821, by Dr. John Valentine Deegen, of Croppenstadt, near Halberstadt.

ervation, is not only sufficiently diminished in volume to close the
ifices of the vessels on the placental surface, but even to close
est sinuses that may be opened during the Cæsarian section, or
sive lacerations of the womb. I saw, in a Cæsarian operation,
pel open the uterus immediately over the placenta—an incision
ough to permit me to extract the child with sufficient facility.
was, of course, through the most vascular part of the organ. I
t say, that the blood bubbled up from the incised surfaces very
; but it wholly ceased to flow as soon as the placenta was re-
rom the womb, so as to permit that organ to contract. The con-
n of the womb, in contracting, shut up the cut vessels as com-
s if ligatures had been applied to them. I repeat again, that a
n clot, shutting the mouth of the womb, may serve as a tampon
all wholly prevent the escape of blood from the cavity, which
as it continues to receive the effusion, until the womb be-
ally as large as at the sixth month; and the larger the womb, the
pacious its vessels. Such clots should be broken up, and re-
They are as dangerous as, but not more so than the artificial
when used after delivery at term. I have never used a tampon
livery at term; but I have seen them used, which came very near
the patient to sink, by detaining the effusion within the cavity.
ciple is false, and the practice dangerous, which resorts to such
of arresting uterine hemorrhage, at term; he who resorts to it,
under the ignorant presumption that uterine, like chirurgical,
age is to be arrested by coagulation of the outflowing blood.
ould be said here, that women very commonly do discharge
orphous clots after delivery, I admit the fact; but I subjoin that
a sufficient degree of irritability in such uteri, the clots would
so large as to require for their formation a wasteful, and even
us or fatal extravasation of the vital fluid. Strong uteri never
hem; weaker ones allow pretty large ones to be formed, and very
ombs fill until the woman faints or dies.

out the Clot.—I should feel happy if I could impress upon the mind of the Student, in such a manner as to make it ever present to him when the occasion demands, that the only certain mode of arresting uterine hemorrhage is to empty the womb and cause it to contract. If a woman have alarming discharges of blood before the delivery of the child, let him take away the child, if he can. If she bleed before the after-birth is withdrawn, let him withdraw it. If she bleed after delivery, let him introduce his fingers into the uterus and break to pieces the firm coagula that he will find in it, or in the vagina; and then by frictions of the hypogaster, or by cold, by pressure, by ergot, and by all the means in his power, let him compel the womb to contract; then, and not until then, will his patient be safe. He should always turn out the clot, if the patient is sickened by it.

Binder.—CASE.—I attended Mrs. J. A. S., confined with her fifth child, in a labor that was perfectly natural, relatively to the birth of the child, the delivery of the placenta, and the symptoms that immediately ensued in the parturient state.

Having waited about half an hour, I took my leave of the patient about two o'clock in the morning, and had proceeded a good way towards my house, when I was overtaken by her husband, who entreated me to hasten back to the lady, as she seemed near dying.

Upon returning to the house, I found my patient without pulse, the face of an excessive paleness, and the whole state expressive of the last degree of sinking or prostration. The idea that immediately became obvious was, that she must have had a large effusion of blood; but, upon placing the hand on the uterine region, the organ was found well condensed; while, upon careful examination of the bed, no very considerable extravasation of blood was detected. I found that the abdominal parietes were very remarkably flaccid; to such a degree as to strike me, forcibly, as affording incompetent support to the viscera within; indeed, the contractility of the abdominal muscles and integuments was so very slight, that it appeared to me the bowels could have derived almost no support from their pressure.

After exhibiting such restoratives as were at hand, I folded two large towels into squares, and placing them upon the abdomen, as compresses, secured them by a bandage, which retained them *in sitû*, and thus afforded such a degree of support to the contained viscera, as I deemed sufficient to obviate the sinking and fainting tendencies which always ensue from a loss of this support or pressure. I enjoined rest in a horizontal posture, removed the pillows from under the head, and when the forces of the constitution rallied there was no further alarm or dis-

t has happened to me many times to meet, after delivery, with
opal state, unaccompanied with hemorrhage, either internal
al; and in all parturient persons, who are enormously distend-
ho are prone to such faintings after delivery, I take the pre-
uggested by the above case in good time; and can safely say,
precautions must result in success.

akening effect of a sudden removal of pressure or support from
ats of the abdomen, is noticed not only in labors, but in tapping
men for dropsy. It is always deemed necessary, in tapping
nded persons, to pass a broad roller round the abdomen, so
strict it in proportion as the water flows off. In cases of para-
where this precaution is not observed, the patient is very apt
and evidently from the same cause I have mentioned, namely,
of pressure on the contained organs. I had occasion, more
years ago, to verify this principle in a case. A young wo-
ssively distended with ascites, was tapped; the water flowed
rapidly; in proportion as it escaped, I tightened the bandage,
ade no complaint of faintness. In order to test the effect of
it, I withdrew all pressure for a very short time, the water
ng, and she immediately began to grow sick and faint; which
s ceased as soon as I renewed the pressure with the bandage.
the greatest confidence, both as to its necessity and efficacy,
herefore recommend, that a bandage should be early placed
e abdomen of such patients as are prone to fainting after de-
the compression, all things being thus ready prepared, may
d soon after the birth, and without disturbing the patient.

ell worth the Student's while to bestow some sober thought
subject of the binder for a newly delivered woman. As a
recaution, it is doubtless a laudable one to bind up the weak-
exhausted abdominal cavity. But, it is questionable as to
it should be used. Certainly after the first days of the con-
it is not to be held necessary as a preventive of syncope or
ge; nor has it any special usefulness beyond the doubtful
storing the woman's shape. But as to this, I think that As-
very correct in his assertion, that it cannot at all restore the
hose restoration depends upon the vital contraction of the mus-
l other tissues that have been relaxed by the gestation. I
much of the too general complaint of prolapsus and retrover-
e womb among American women may be attributed to the use
ges worn so tight, and so long, as to drive the recovering uterus

to the bottom of the pelvis, or even overset it backwards into the hollow of the sacrum.

Diet.—The diet of a woman recently delivered, ought to be very light, and of easy digestion; tea, bread, gruel, vegetable jellies, and panada suffice, and are the safest materials during the three or four first days of the accouchement. Circumstances may demand a more liberal allowance; but for persons who have small lochial evacuations, or who are of an excitable constitution, the simplest elements of nutrition only should be prescribed. For a surgical patient, both before and after the completion of the operation, a regimen is deemed of vital importance; and yet the shock to the constitution, and the irritative influences of the wound, in severe or capital operations, being not greater than those developed by many instances of labor, are not dietetic precautions equally proper, then, in both cases? In addition to these considerations, it ought to be remembered that, during the months of gestation, the fluxional determinations have been towards the uterus; but now the wave of vital fluids is marching towards another set of organs, and great disturbances are, many times, occasioned by this mutation of directions. The effort of the constitution produces fever, which commences simultaneously with the irritation of the mammary glands; but, happily, when those glands are enabled to throw off an abundant secretion, the whole constitution is relieved by the evacuation, and the fever undergoes a crisis, as well marked as that of a bilious remittent, or any other febrile disorder that goes off by a profuse diaphoresis or diarrhœa. Let the body, then, be prepared for this fever, by a correct course of diet; and when that crisis has been completed, much of the hazard of an accouchement will be already overpassed, and a reasonable indulgence in stronger food become safe and proper.

Suckling.—The child should be put to the breast as soon as the mother has recovered sufficiently from her fatigue and exhaustion. This is a natural course—it is, therefore, the best one; for by the act of sucking, the new determinations, about to arise, are invited to, and restrained within their proper bounds: the vital wave ought to come hitherto, but no farther. Such a course is useful for the child, which generally procures, from the earliest lactation, some saline fluids that have a favorable influence on its digestive tube; and for which ought not to be substituted that pernicious compound, molasses and water, which every child in the country is doomed to swallow, at the cost of a

ach and flatulent bowels, displayed in the almost universally re-
mptoms of colic, green stools, and vomiting. The antediluvian
ad no molasses and water for their children, who lived, never-
thousand years. Certainly nothing can be more conformable
states of nature, than an early application of the infant to
r's breast. If we could suppose a woman in a state of nature,
ivered alone, under the shade of some primeval forest, and
ed, observe her conduct, we should witness the instinctive
ts and promptings of nature, that would far better guide us
nagement of such affairs, than the crude conceptions of those
ver ready to boast of the excellence of art or skill over the
estions of instinct. Such a mother would soon be aroused
weakness and languor that succeed the pangs and throes of
h, by the cries of her helpless offspring. She would take it,
s a little returning strength should permit, into her arms, and
y-born child would probably not nestle a moment on the
bosom, without finding the source of its future aliment: the
omical structure, both of the maternal arms and breast, and
ctive motions of the child's head, would bring its lips speedily
t with the nipple. But we, wiser than our great instructress,
p the new-born child away from its natural resting-place, and
of the most appropriate nutriment for two or three days, in
eschew sore nipples, or to propitiate some other imaginary
le we allow the breast to fill almost to bursting, and actually
e from distension, before we admit that preparation to be
which our presumptuous interference, in this manner, vitiates
les. The child ought to be put to the breast as soon as the
strong enough to take it.

dine.—It is a good custom to give an aperient medicine on
day, or about seventy hours after delivery; while, in most
s safest to defer the administration, at least up to this period.
rbations of vital action in the abdominal viscera, occasioned
ines administered too early, are observed to result in symp-
congestion, and of peritoneal fever, in not a few instances,
ly where an epidemic tendency to the latter malady exists.
ld be well understood in the lying-in apartment, that no medi-
to be given to the mother or the child, without the sanction
of the medical attendant. In our part of the country, it is
ly common for the nurse to take upon herself the function of
r, and administer a dose of severe cathartic medicine, upon

her own responsibility; which, however great and important she may deem it, remains, after all, with the physician. He it is who bears the burden, and undergoes all the trouble and anxiety and responsibility of the management. He ought, therefore, always to direct that no interference with his rights should be suffered to take place. There are many reasons why he should be the sole director of the case; for it is not a matter of indifference what particular article is selected, any more than it is of little consequence at what moment the medicine (if any) should be administered.

Castor oil is the article in most request for this period of the confinement; and in a dose of half an ounce operates sufficiently well. Where the castor oil is particularly disagreeable, a proper quantity of magnesia and rhubarb; of infusion of senna; of Epsom salts; of Seidlitz powders, may be substituted; but, in general, the oil is to be preferred, because of the great certainty and moderation with which it operates on the bowels.

Lochia.—The lochial discharges grow gradually less abundant, and of a paler color. The tone of the womb itself must determine, in a great measure, the duration and amount of the discharge. It disappears in the third week, and sometimes earlier. Not a few women continue to have a show in the fifth week; and, in fact, the Jewish women had their purification at the fortieth day, which probably might be founded on observations as well suited to the inhabitants of this country as to those of the Holy Land.

Etherization.—In speaking of the various points in the Conduct of a labor, I cannot well eschew to say something upon the employment of those anæsthetic agents whose recent irruption into the domain of Medicine and Surgery has been so sudden, violent, and overbearing.

To avoid altogether any notice of these agents would have been more consonant with my taste as well as with my views of medical duty; but as I feel that those who may please to have this book will surely expect to find a record of my opinions on anæsthesia as an obstetric resource, I feel constrained to overcome my reluctance to say anything concerning it.

In Philadelphia, the use of ether and chloroform in Surgery and Midwifery has made no great progress, notwithstanding the very numerous reports upon the benefits derived from those agents in Europe and in parts of the United States. Some of our surgeons in this metropolis have applied the ether inhalation in their surgical cases—and some persons in labor have likewise been rendered insensible to their pain by breathing the vapor of chloroform or ether. I am not able to say in how many instances this recourse has been had here; but I should suppose that not fewer than some hundreds of women have been subjected to it on account of labor; and I believe the practice does not become much more common and general in our community; and that not a great many more women in labor will have been etherized in 1852 than in 1850–51.

I do not feel inclined at all to deny that there may be instances of severe suffering for women in labor, that ought to be mitigated or even wholly obviated by casting the woman into the profound anæsthesia of etherization. But what I do desire to say is this, viz.: that, having carefully studied the reports upon etherization and chloroformisation, whether those of this country or those produced in Europe, I remain as yet unconvinced—either of the necessity for the method, or of its propriety as an ordinary recourse.

1st. As to its necessity in ordinary cases of parturition. The average duration of labor is four hours, and I have shown at page 289 that the number of labor pains is about fifty; and that they last, each about thirty seconds, so that the parturient woman really suffers from labor pains about twenty-five minutes and no more—and these twenty-five minutes are distributed among the four hours of a labor of mean duration.

It has never been pretended that the motive for the anæsthetic practice has any connection with the other pains of women in labor, but only with the suffering from *contraction* or *labor-pains;* for, though we may well suppose that women suffer from painful sensations independent of those arising from the actually contracting womb, yet we find them in general, easy, complacent, and but too happy when *the pain* is off. Hence the ether is exhibited for *the pain*, and for no other motive.

I contend, that it is to an exaggerated notion of the nature of labor-pains we owe the too frequent use of ether in our art; for if the mean of labor-pain be only twenty-five minutes in all, there can be no necessity in the average of cases for its exhibition. I should find the objection to it less and the inducement greater, were the twenty-five minutes of pain to be always twenty-five consecutive minutes. When they are distributed through two hundred and forty minutes, or four hours, I look upon the exhibition as unnecessary and uncalled for.

2d. The representations that have been made by the friends of anæsthesia, of the harrowing distress endured by women in childbirth, do not consist with the general state of facts in the case; and it is quite true that a lying-in room is, for the most of the labor, a scene of cheerfulness and gayety, instead of the shrieks and anguish and despair that have been so forcibly portrayed.

Few women lose their health or their lives in labor, and the dread of future sufferings is insufficient to prevent the increase of the family. As to the necessity of the Letheon practice, the birth of the past myriads of the race shows that it is not necessary.

The propriety of resorting to the use of chloroform and ether as means of obviating the pain and hazards of labor is a question to be settled by an estimate of the safeness as well as necessity of it. It were well, before making up his mind upon this point, were the Student to make himself aware that the encephalon is a compound organ, or a compound bulbous nervous mass; part of which (the hemispheres) are devoted to the offices of intellection; part, the cerebellum, to the duty of co-ordinating or regulating the movement, or the force which is generated perhaps by the whole nervous mass; a part, the tubercula quadrigemina, to the faculty of seeing or vision; and a part, the medulla oblongata, to the important office of governing or giving origin to the act of respiration. Thus we have the brain of intellection, and those of co-ordination of force, of vision, and of respiration. They might be denominated the thinking, co-ordinating, seeing, and breathing bulbs of the nervous mass.

Now, it appears from manynumerous reports contained in the *Comptes Rendus* of the French Institute, and from papers in various journals containing accounts of experiments made both in men and in animals, that to breathe for a few minutes the vapor of ether, or of chloroform and various volatile liquids, is to cast the subject into an insensibility called anæsthesia, so profound that the cautery, whether actual or potential, the bistoury, the ligation, or the forceps are equally incapable of exciting any sense of pain. Nay, more, that the patient, in some instances, looks upon the incision of his flesh without feeling the knife.

Very soon after ceasing to inhale the vapor, the insensibility disappears, and the individual, upon recovering the use of his faculties, is with difficulty persuaded to admit that he has been subjected to a severe operation; while the mother is incredulous as to her having borne a child during her sleep. Such are the facts. The Student ought to know them. Half an ounce to an ounce of ether poured upon a sponge, and held to the mouth and nose, or a drachm to two or three drachms of chloroform administered in the same way, bring on the insensibility in from three to ten minutes, less or more. The insensibility, once produced, may be maintained according to the pleasure of the physician, by repeating the application of the moistened sponge from time to time upon any manifest signs of returning consciousness.

The statements show that the power of these anæsthetics is capable of abolishing the sensibility without greatly interfering with the motor power of the subject—or it may abolish the motor power, and allow the sensitive power to be acute as in health. The inhalation may produce anæsthesia of the thinking brain, yet leave the co-ordinating, breathing, and seeing brains intact—or it may put a temporary end to the power of the cerebellum and tubercula quadrigemina without influencing the other parts of the encephalon. In short, there is no ascertained law of progression in the activity or power of the anæsthetic agent, chloroform; and no man knows, when he begins to administer the article, upon what part of the brain it will proceed to exert its benumbing power. M. Flourens has shown, that all the other parts of the brain may be safely suspended of their forces, provided the medulla oblongata remain unattacked by the agent; and that, as long as the medulla oblongata retains its energy, it is capable of recalling the other bulbs to life and activity through its own force, provided the further inhalation of the letheon be arrested. Hence he calls the medulla oblongata the *vital* tie, (*le nœud vital*,) since it binds the rest of the encephalon and nervous system with its "silver cord."

Now I have to suggest to the Student the propriety of asking what would be his feelings, provided in any such case this silver cord should be loosened; and I ask him whether, if the anæsthesia should proceed at first, or secondarily, to attack and overthrow the power of the medulla oblongata, his patient would not be instantly deprived of life! For if to breathe is to live, to be deprived of the uses of the medulla oblongata is to die—since on that *nœud vital* depends the whole business of the oxygenation of the body.

Many, and but too many examples of the power of these tremendous agents to overthrow, almost instantly, the force resident in the medulla oblongata are spread upon the records of medicine in the last few years. I do not well understand how those persons can recover their composure or their complacency who, by an unnecessary and inappropriate resort to so dangerous a process, have seen the victims of this extraordinary power struck lifeless before their eyes.

It behooves not me to enter into the lists with the surgeons who cast their patients into the deep insensibility of etherization before performing their operations—*suum cuique tribuito* is a proper law for me in this place. But I cannot avoid the feeling of astonishment which seizes upon me when I read the details of cases of midwifery that have been treated during the long profound *Drunkenness* of etherization. To be insensible from whiskey, and gin, and brandy, and wine, and beer, and ether, and chloroform, is to be what in the world is called Dead-drunk. No reasoning—no argumentation is strong enough to point out the ninth part of a hair's discrimination between them—except that the volatility of one of the agents or its diffusibility as a stimulant narcotic, enables it sooner to produce its intoxicating effect, which is sooner recovered from in one case than in any other of the use of an intoxicating drug.

I showed, in the first part of this section, why I deemed the use of etherization in Midwifery unnecessary; in the second part, I have endeavored to show why it is improper. I have by no means said what I am inclined to say as to the doubtful nature of any processes, that the physician sets up, to contravene the operation of those natural and physiological forces that the Divinity has ordained us to enjoy or to suffer. The question is often propounded as to the Beneficence that ordained woman to the sorrow and pain of them that travail in childbirth. It ought to be taken for granted, without any, the least, disposition to what is called *canting*, that some economical connection exists betwixt the power and the pain of labors. While, therefore, we may assume the privilege to control, check, and diminish the pains of labor whenever they become so great as to be properly deemed pathological, I deny that we have the professional right, in order wholly to prevent or obviate these physiological states, to place the lives of women on the hazard of that *progress* of anæsthesia, whose laws are not, and probably can never be ascertained, so as to be truly foreknown. Notwithstanding I have expressed the above opinions in regard to etherization in Midwifery, which might suffice to expose my sentiments upon that topic, still, my respect for eminent brethren who think differently calls upon me to acknowledge their equal rights, and probably superior claims to the confidence of the Student. Professor Simpson, of the University of Edinburgh, it is well known, is among the most distinguished and able advocates of anæsthesia, in our art. I will not, therefore, refrain from laying before the reader the following letter from that eminent gentleman, with my answer to his communication.

Letter from Professor Simpson.

"EDINBURGH, *January* 23*d*, 1848.

IR: By private letters from America, brought by the last
hear that in most of the cities of the Union, your chemists
in preparing proper chloroform; and that, consequently,
eriments tried with it had been unsuccessful. In Great
nd on the Continent of Europe, chloroform has everywhere
r nearly entirely, superseded the use of sulphuric ether, as
hetic agent. The want of success which has attended its
nt in America is, perhaps, owing in a great measure to an
ny own, viz: to my not stating, in my original account of it,
r method of purifying it. This and other omissions were
the haste with which my first paper was drawn up.

eel, therefore, deeply obliged by your taking any measures
may deem fit, to circulate amongst American medical men
la which I inclose for the preparation of chloroform. It is
la used by Messrs. Duncan and Flockhart, our Edinburgh
who have already manufactured enormous quantities of it.
ys now are able to produce it as heavy as 1500 in specific
Their first distillation of it is made in two large wooden
ith a third similar barrel as a receiver. They throw hot
the first two barrels, which serves to afford both sufficient
water for the process. They employ sixty pounds of chlo-
ne at each distillation, and have been able to manufacture
dred ounces of chloroform a day. Each ounce of the chlo-
, in the long run, about half an ounce of chloroform: con-
, to obtain three hundred ounces, (as above,) about six hun-
es of bleaching powder are required. At first, they could
e ten or twenty ounces per diem, then they rose to sixty, and
nlarging their barrels, they can make, as I have said, three
unces in the twenty-four hours.

other chemical houses in Edinburgh, Liverpool, Glasgow,
ndon, &c., are busy manufacturing it in great quantities.
p their formulas as secrets. But none of them make so good
as Duncan & Flockhart, whose formula I append.

tements which I have already made may show you to what
the chloroform is used in this country; and our chemists tell
he demand for it steadily increases with them.

gery, its use is quite general, for operations, painful diagnosis, &c. My friend, Mr. Andrew Wood, has just been telling me of a beautiful application of it. A boy fell from a height, and severely injured his thigh. It was so painful that he shrieked when Dr. Wood tried to handle the limb, and would not allow of a proper examination. Dr. W. immediately chloroformed him—at once ascertained that the femur was fractured—kept him anæsthetic till he sent for his splints—and did not allow his patient to awake till his limb was all properly set, bandaged, and adjusted.

In *Medicine*, its effects are being extensively tried as an anodyne, an anæsthetic, a diffusible stimulant, &c. Its antispasmodic powers in colic, asthma, &c. are everywhere recognized.

In *Midwifery*, most or all of my brethren in Edinburgh employ it constantly. The ladies themselves insist on not being doomed to suffer, when suffering is so totally unnecessary. In London, Dublin, &c., it every day gains converts to its obstetric employment, and I have no doubt that those who most bitterly oppose it now, will be yet, in ten or twenty years hence, amazed at their own professional cruelty. They allow their medical prejudices to smother and overrule the common dictates of their profession, and of humanity.

No accidents have as yet happened under its use, though several hundred thousand must have already been under the influence of chloroform. Its use here has been a common amusement in drawing-room parties, for the last two or three months.

I never now apply it with anything but a silk handkerchief. In surgical cases and operations, the quantity given is not in general measured. We all judge more by the *effects* than the *quantity*. Generally, I believe, we pour two or three drachms on the handkerchief at once, and more in *a minute*, if no sufficient effect is produced, and we stop when sonorous respiration begins. Not unfrequently spasms, rigidity, &c., come on, but they disappear as the effect increases, and none of us care for them any more than for hysteric symptoms; nor do they leave any bad effect. But the mere *appearance* of them is enough to terrify a beginner.

I shall be glad to hear how the cause of anæsthesia gets on among you, and I remain with great respect, Very faithfully yours,

J. Y. SIMPSON.

To PROFESSOR MEIGS.

ollowing is the Formula for Chloroform, communicated by
r Simpson :—

ke of Chloride of Lime, in powder,	4 pounds.
Water, . . .	12 "
Rectified Spirits, . .	12 fluidounces.

'Dumas.'

hloride of lime and water being first well mixed together, the
added. Heat is then applied to the still (which ought not to
than a third full), but as soon as the upper part of the still
warm, the heat is withdrawn, and the action allowed to go on
. In a short time the distillation commences, and whenever it
o go on slowly, the heat is again applied. The fluid which
ver, separates into two layers, the lower of which is Chloroform.
ter having been separated from the weak spirit forming the
yer, is purified by being mixed with half its measure of strong
c acid, added gradually. The mixture, when cool, is poured
aden retort, and distilled from as much carbonate of baryta by
as there is of sulphuric acid by measure. The product should
ed to stand over quicklime for a day or two, and repeatedly
and then re-distilled from the lime."

Reply to Prof. Simpson's Letter.

"PHILADELPHIA, *Feb.* 18*th*, 1848.

SIR : I have to acknowledge the favor of your letter of Jan.
ich I received yesterday.

hemists in this country have produced very perfect chloroform,
pecific gravity of 1450, as I am informed, and which is much
d in dentistry operations, and to a considerable extent also in

sume you will, ere this date, have received copies of Prof. War-
mphlet on "Etherization," which may inform you, very fully,
use of the anæsthetic agent in the Massachusetts General Hos-
d in Boston. That eminent gentleman is more reserved as to
etric employment of the agent; much more so, I understand,
her Dr. Channing or Dr. Homans, and other practitioners, who
e of it very commonly.

w York, as I learn, the surgical application of chloroform is
, while its obstetrical use has not as yet acquired a general

iladelphia, we have the Pennsylvania Hospital, with more than two hundred beds. A very considerable amount of surgical practice, which renders that house a favorite clinical study for medical students of the United States, has not, as yet, furnished a single example of the exhibition of chloroform or ether as anæsthetic agents. The Surgical Staff of the institution have not become convinced of the propriety of such a recourse in the operations performed there.

In the Jefferson College, to which I am attached, as Professor of Midwifery, etc., there is a Medical and Surgical Clinic held on the Wednesday and Saturday of each week. The resort of surgical cases there is very great, and a Clinical day rarely passes without some surgical operations before the classes. The clinical professors (in surgery), Drs. Mütter and Pancoast, almost invariably employ the chloroform, and the successful exhibition of the article has entirely confirmed them in their opinion of its great value. Some of the operations have been of the gravest character, and no serious event has occurred to check the career of the remedy.

As to its employment in Midwifery here, notwithstanding a few cases have been mentioned and reported, I think it has not yet begun to find favor with accoucheurs.

I have not exhibited it in any case; nor do I, at present, know of any intention in that way, entertained by the leading practitioners of obstetrical medicine and surgery, in this city. I have not yielded to several solicitations as to its exhibition, addressed to me by my patients in labor.

As to the extension of the anæsthesia in the Southern and Western States, I am not at present enabled to give you information. I believe the practice is slowly gaining converts, and that it will become more and more common ere long.

You may perhaps feel surprised at this admission on my part, seeing that I am still a recusant; and I ought, therefore, to be allowed to explain myself, lest I should continue to appear unreasonable in your eyes.

Having carefully read the *Comptes Rendus* of the Royal Academy of Medicine of Paris, which contained full reports of the copious discussions on the question of the Letheon, a few months since, and having also seen the English and American Reports in the Journals, and particularly having read your own pamphlet of "Remarks," &c., I may not properly be accused of ignorance of the power, effects, or motives, in relation to chloroformization in surgery, or obstetricy. The copy of your own pamphlet, for which I now beg leave to thank you, would necessarily have put me *au niveau* on the subject.

being myself engaged in the practice of surgery, proper, I pre- avoid any expression of opinion as to the propriety of the prac- ınd I do this upon the principle, *suum cuique tribuito.* It would impertinence in me, were I to interfere with the conduct of the ns.

, in Midwifery, to which a long and extensive practice has enured ıd rendered me a familiar dispassionate witness of its various and phenomena, I am less liable to misconceptions. And here, me to say, I have been accustomed to look upon the sensation of n labor as a physiological relation of the power, or force; and hstanding I have seen so many women in the throes of labor, I lways regarded a labor-pain as a most desirable, salutary, and vative manifestation of life-force. I have found that women, ed they were sustained by cheering counsel and promises, and lly freed from the distressing element of terror, could in general le to endure without great complaint, those labor-pains which ends of the anæsthesia desire so earnestly to abolish and nullify the fair daughters of Eve.

haps, dear sir, I *am* cruel in taking so dispassionate a view of se; and it is even possible that I may make one of the number se "amazed" converts of whom you speak in your worthy letter . But, for the present, regarding the pain of a Natural labor ate not, by *all* possible means, and always, to be eschewed and ed, I cannot bring myself to the conviction that of the two, er labor-pain or insensibility, insensibility is to be preferred.

could believe that *chloroformal* insensibility is sleep indeed, the considerable of my objections would vanish. Chloroform is not rific; and I see in the anæsthesia it superinduces a state of rvous system in no wise differing from the anæsthetic results of lic potations, save in the suddenness and transitiveness of its ice.

eely admit, for I know it, that many thousands of persons are ubjected to its power. Yet I feel that no law of succession of ion on the several distinct parts of the brain has been, or can grave objections would perhaps vanish, could the law of the suc- ı of influences on the parts of the brain be clearly made out, s provisions insured. There are, indubitably, certain cases in the intellectual hemispheres are totally hebetized, and deprived er by it, while the co-ordinating lobes remain perfectly unaffect- n others, the motor cords of the cerebro-spinal nerves are deprived of power, whilst the sensitive cords enjoy a full activity, and *vice versâ.*

In some instances, the seeing brain enables the patient to look upon the application of a cautery that he does not feel, while it sears him, or of a bistoury whose edge gives him no pain. In others, the influence of the agent upon the sources of the pneumogastric and phrenic nerves is dangerously, or at least alarmingly, made manifest by modifications of the respiratory force. It appears to me, therefore, quite certain, that there is no known law of succession of the ether-influences on the several parts of the brain. It is known that the continued aspiration of the vapor brings at last the medulla oblongata fully under its anæsthetic power, and the consequent cessation of respiration which determines the cessation of the oxygenation of the blood, and thereby of the brain, is death. M. Flourens's experiments, and others, especially those by the younger Mr. Wakley, of the *Lancet*, prove very conclusively that the aspiration of ether or chloroform, continued but a little longer than the period required for hebetizing the hemispheres, the cerebellum, the tubercula quadrigemina, and the cord, overthrows the medulla oblongata, and produces thereby sudden death. I fully believe with M. Flourens, that the medulla oblongata is the *nœud vital*, and that, though later brought under the power of chloroformization, it is always reducible under it. Hence, I fear that, in all cases of chloroformal anæsthesia, there remains but one irrevocable step more to the grave.

I readily hear, before your voice can reach me across the Atlantic, the triumphant reply that an hundred thousand have taken it *without accident!* I am a witness that it is attended with alarming accidents, however rarely. But should I exhibit the remedy for pain to a thousand patients in labor, merely to prevent the physiological pain, and for no other motive—and if I should in consequence destroy only one of them, I should feel disposed to clothe me in sackcloth, and cast ashes on my head for the remainder of my days. What sufficient motive have I to risk the life or the death of one in a thousand, in a questionable attempt to abrogate one of the general health-conditions of man?

ment of pain, the question changes. There is no reasonable therapeia of health. Hygienical processes are good and valid. The sick need a physician, not they that are well. To be in natural labor, is the culminating point of the female somatic forces. There is, in natural labor, no element of disease—and, therefore, the good old writers have said nothing truer nor wiser than their old saying, that "*a meddlesome midwifery is bad.*" Is chloroformization meddlesome?

Your countryman, old Thomas Rainold, in the "Woman's Booke, or The Byrthe of Mankynde," at fol. liii., says, "Very many be the perilles, daungers, and thronges, which chaunce to women in theyr labour." These are the cases requiring our therapeutical and chirurgical intervention. You will, my dear sir, think me a hopeless recusant, if I decline the anæsthesia here also. I pray you, therefore, allow me to state my reasons for such recusancy.

If I were amputating a limb, or extirpating a tumor, I should see all the steps of my incisions, ligations, &c. But if I apply my forceps in a right occipito-posterior position, (fourth of Baudelocque,) I know that I thrust the blade of the male branch far upwards betwixt the face of the child and the upper third of the vagina, which, in this case, is already greatly expanded, and that the extremity of the blade is separated from the peritoneum only by the mucous and condensed cellular coat of the tube. Now, no man can *absolutely* know the precise degree of inclination his patient will give to the plane of her superior strait, while in pain; an inclination to be modified by every movement of her body and limbs. Under such absolute uncertainty, the best guide of the accoucheur is the reply of the patient to his interrogatory, "Does it hurt you?" The patient's reply, "Yes," or "No," is worth a thousand dogmas and precepts, as to planes and axes, and curves of Carus. I cannot, therefore, deem myself justified in casting away my safest and most trustworthy diagnosis, for the questionable equivalent of ten minutes' exemption from a pain, which, even in this case, is a physiological pain.

Having thus, in my own defence, and not as attacking your opinion, set forth the motives that have hitherto served to restrain me from the administration of chloroform, I desist from giving you any farther trouble in this line of thought. I have, Sir, a far more pleasing duty to perform, in saying that your name is as well known, perhaps, in America as in your native land, and to congratulate you on the extension of your fame. I had the pleasure to read your interesting letter to my class, consisting of several hundred young gentlemen, who listened to your words with the same respect they would have paid to you, had they been pronounced by your own lips. They will disperse themselves in a few days hence, over all the States of the Union, and thus will have it in their power to report the latest dates of your opinions as to chloroform. I shall also allow it to be published on the first proximo, in a medical journal of extensive circulation. You will herein perceive the readiness with which I assist in disseminating your views. It is not without regret that I find myself opposed to your opinions in the case. That difference ought not, however, in the least degree to affect those sentiments of respectful consideration and real esteem with which I am, dear sir, very faithfully, your obedient servant,

CH. D. MEIGS.

PROFESSOR SIMPSON, &c.

Having reprinted the foregoing in this new edition, in order that the reader might see what I said and thought in a Journal in 1848, I have now to state that I adhere, in 1852, to these opinions, and consider them sound and just, and recommend them with a clear conscience to my readers.

Since the date of my letter to Prof. Simpson, I have been induced by many motives to administer ether, (never have I given, nor will I ever give any person chloroform,) in a considerable number of cases: many of the women were delighted with its operation after they had recovered from the intoxication, but about an equal number appeared to have been disgusted with, or indifferent to, its effects. I have certainly observed, in most of the experiments, that it lessened the frequency and power of the pains; and, in some of them, I was obliged to lay it aside wholly, until the motor powers of the womb, recovering from the stupefying influence of the intoxication or dead-drunkenness of the woman, allowed the labor to proceed, or to be terminated by a forceps operation. I have lost two children in labor because of the anæsthesia, as I fully believe; and some of my patients have had affections and post-partum symptoms, the remembrance of which makes me well content to remain among the opponents of the practice.

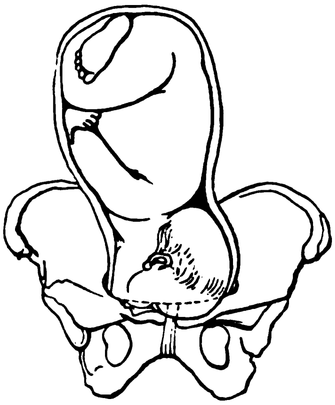
I say these things not with any feeling of disrespect, nor with a desire to disparage those of my medical brethren who habitually employ the anæsthetics in Midwifery; but in order that I may speak the truth as it appears to me, and let that truth pass for as much as it is worth, and no more. I shall only add that I sincerely regret the introduction of anæsthetics into Midwifery; not because they are not useful and laudable in some rare cases, but from a conviction that the use of them has become a great abuse, which I believe will become greater until the day—no distant one—shall arrive, when mankind, and the profession also, shall have been convinced that the doctors have made a mistake on this point, in this part of the nineteenth century.

CHAPTER XI.

FACE PRESENTATIONS.

IN cases in which the usual dip of the occipito-frontal diameter fails o take place, but, on the contrary, is reversed, so as to allow the chin o depart far from the breast, the head may be actually turned over ackwards, permitting the child's face to fall down into the pelvis.

Fig. 82.



In face presentations, as delineated n Fig. 82, annexed, the chin is on ne side, and the *top* of the forehead pon the other side of the pelvis. he face seems to be looking directly ownwards into the excavation of the ower basin. This could not be the ase without complete departure of he chin from the breast (*see the igure*), and an absolute overset of the ead backwards, as in a person who hould be looking upwards at an object irectly overhead.

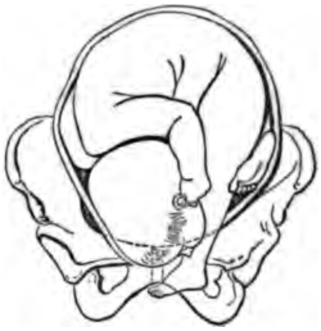
These are what are denominated Face Presentations: a sort of labors hat are thought to be less unnatural and dangerous, now, than in ormer times. I am clearly of opinion that face cases may well be ncluded among the natural labors, except where some failure in the owers of the woman should cause us to convert them into preternatual ones, feeling obliged to turn and deliver by the feet; to restore the ertex by some serious operation; or to extract with the forceps, or ther instrument.

The fœtal head being an oval, five inches long, from the vertex to he chin, and more than three and a half inches wide at the widest art, it ought to make no difference, as far as the mere head is conerned, whether the chin or the vertex advances first in labor, because, in either case, the same circumferences of the head are presented to the planes through which they are to be transmitted. The foramen magnum of the occipital bone being nearly equidistant from the vertex and chin, and situated on one side of the oval, the peculiar difficulties and hazards of these labors are attributable, rather to the nature of the articulation by which the neck and head are conjoined, than to the form of the head itself, when advancing with the face downwards. The nature of this articulation is such, that extension of the head cannot take place so well as flexion: hence the requisite dip of the occipito-frontal diameter is not effected in face cases without difficulty, and the consumption of much time.

Let the reader figure to himself the state of the spinal column of a child, urged on in labor by powerful uterine contractions, directed to its expulsion with the face in advance. The inferior-posterior part of the head is pressed against the back of its neck, or betwixt its scapulæ, which could not be the case without bending the cervical spine backwards, like a bow, while the dorsal and lumbar vertebræ are curved in the opposite direction, causing thus a double antero-posterior curve, on which, in consequence of the elasticity of the two arches, much of the expulsive force is vainly expended; so that, though the power may be as great as in a common labor, it produces much less effect than in a common labor—a great part of every pain being expended in reproducing the greatest amount of curvature; for the elasticity of the two curves is such that they are straightened as soon as the pain subsides at least in some measure, while the rest of the pain is used in pushing the face onwards.

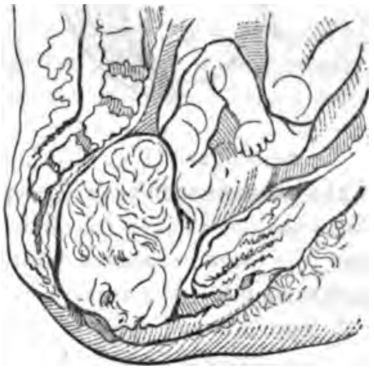
A child in utero ought to be in a state of universal flexion, as I have already remarked. It cannot be in extension, as supposed by the old authors, whose rude cuts, accompanying their crude descriptions of labors, are calculated to excite a smile of pity in any modern obstetrician. In this state of flexion, the chin approaches or even touches the breast. Such a flexion in a head labor always gives us a vertex position. But if the chin, instead of approaching, depart from the breast, there is a tendency towards the face presentation. Let the Student consider that when the chin departs from the breast, it does so by slow degrees, and not suddenly, nor wholly, at once. Hence he should in face presentations, whose whole progress he has opportunity to supervise, expect to touch at first the top of the forehead as the lowest point, or presenting point. As the labor goes on, the head continues to turn over more and more completely until it is at last quite overset backwards; as may be seen in the annexed drawing (Fig. 83), in which, in addition to a face presentation, there is a prolapsion of the left foot. If, in such a labor as this, the foot were thrust back into the womb during the absence of a pain, we should have a very bad case of face labor, with the chin to the sacrum, and the forehead to the pubis.

Fig. 83.



When the face presents, the head does not enter the excavation with the fronto-mental diameter parallel to the plane of the strait. On the contrary, the frontal extremity of that line is lowest at first, but the mental extremity of it comes at length to be lowest, at least as regards the successive planes through which it passes in the lower part of the pelvis, as may be seen on reference to the neat figure which is annexed.

Fig. 84.



The direction taken by the face, as it proceeds, in such a labor, is worthy of the closest attention of the practitioner. Should the chin enter the superior strait near to the acetabulum, it will afterwards rotate towards the arch of the pubis, and, escaping under that arch, will rise upwards over the pudendum, so as to allow the under aspect of the chin and the throat to be applied to the arch, and to the front of the symphysis, while the remainder of the head is evolving itself from the os externum. In such a birth, the part that first emerges is the chin ; then the mouth, the nose, the forehead, the crown ; and, last of all, the vertex, which escapes over the fourchette, whereupon the flexion of the head immediately becomes complete again.

[illegible] and it will generally be found that a well-formed pelvis is capable of transmitting a child of moderate size almost as speedily and safely, in such a labor, as if it were a vertex presentation. Let it be remembered that the symphysis of the pubis is only one inch and a half long, and of course, if the chin should escape under the arch, the neck is so long that the throat can apply itself against the inside of the symphysis, allowing the chin, nay the whole head to be born, before any part of the thorax of the infant begins to plunge into the excavation.

Figure 85 may serve to show how the chin, in a favorable case, comes at last to the symphysis pubis, slides down behind it, and at length begins to emerge underneath the crown of the pubal arch. Look at the figure; reflect that the occipito-mental diameter is five inches, and the pelvis only four and a half; and that, as soon as the chin begins to come forward under the arch, the five inch mento-occipital diameter is coming with its mental extremity out beneath the arch.

Fig. 85.

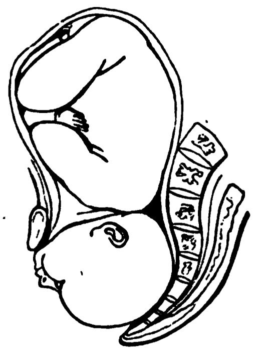
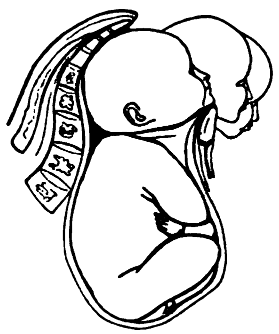


Fig. 86.



The next figure (Fig. 86) shows how the chin rises upwards in front of the pubis as soon as it begins to escape beyond the arch, and thus allows the head to roll out of the excavation. The three outline heads show the three successive positions of the cranium after the chin has once come under the arch.

A very contrary state of things from the foregoing obtains where the chin, instead of revolving towards the front, turns towards the back part of the pelvis. Here the forehead must appear first; then the nose; next the mouth; and lastly, the chin, escaping from the edge of the perineum, retreats towards the point of the coccyx, allowing the crown of the head to pass out under the arch; and finally, the vertex emerges, which concludes the delivery of the head. I say that the [illegible] born is the chin. When the chin has escaped, and begun to retreat behind the perineum, the mouth becomes delivered, then the nose and eyes, top of the forehead, crown, and lastly the vertex. This must be the case, considering that the occipito-mental diameter is fully five inches long, and that there is no antero-posterior, oblique, or transverse line of such length in any part of the lower excavation. It is impossible then to see-saw a diameter of more than five inches within the excavation. Therefore, if the mental extremity of the occipito-mental diameter descends first, it must escape first, and the occipital extremity last. But, while the chin is sweeping, slowly and painfully, down the curve of the sacrum, and especially, when it is got so low as the edge of the perineum, the breast of the child is also entering the pelvis, where the space it should occupy is already taken up by the perpendicular diameter of the head. Imagine the painful distension of the parts within the pelvis, and the enormous extension of the os externum, required for the exit of the child, in such a case!

Fig. 87.

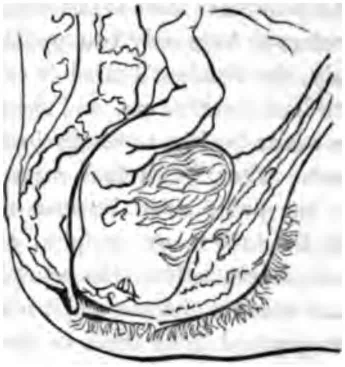


Figure 87 shows the difficulty that is produced by a rotation of the chin backwards, in so clear a light, that I hope it may greatly assist in teaching the young Student how extremely important a matter it is to give all possible aid and assistance to nature, in her attempts to turn it towards the front of the pelvis.

The cause of face presentations is not perfectly well understood; it is, however, probable that they are more commonly occasioned by an obliquity of the womb than by any other cause. For example, let the womb, at the onset of labor, be so oblique as to throw its fundus far down to the left side, the child presenting by the head, and the vertex to the right side of the pelvis: the direction of the expulsive force operating on the infant will propel its head against the edge or brim of the pelvis, and either cause the head to glance upwards into the iliac fossa, so as to let a shoulder fall into the opening, or it will be turned over, so as to let the face fall into the opening, and thus produce a face presentation, in which the chin is near to the left acetabulum, and the forehead to the right sacro-iliac junction. It is easy to set this in a clear light, especially if it be accompanied with demonstrations on the *phantome*.

In my opinion, it would be right to admit, in a systematic arrangement, only two original positions of face-presentations: viz., one with the chin to the right, and one with it to the left of the pelvis; it being always understood, that the position is not necessarily exactly transverse, but that the chin may be variously addressed, sometimes, and indeed most generally being so far back as to be near the sacro-iliac symphysis, and sometimes more anteriorly, or near the body of the pubis; Velpeau prefers to have only two positions. By admitting these two positions only, the Student's mind is relieved from the burden of unnecessary artificial distinctions; and should he in practice rest upon them, it will be easier for him to comprehend the practical doctrines relative to the case. Thus, in all face cases, the great doctrine is to bring the chin to the pubic arch, because the chin, being the mental extremity of the five inch mento-occipital diameter, may escape by gliding downwards, behind the symphysis pubis; whereas, if it be directed backwards to the sacrum, it must slide five inches down the sacrum and coccyx, and from three to three and a half inches over the extended perineum, before it can be born; but, five inches and three inches are eight inches. The child's neck is not eight inches long. Therefore, before the chin can slide down the sacrum, and off the anterior edge of the extended perineum, a good part of the child's thorax must be pushed or jammed into the excavation along with the head, the vertical diameter of which alone is more than three and a half inches. See Fig. 87. If we should adopt four positions, we must have a doctrine for each; but with the two only, there is a necessity for only one doctrine —namely, to bring the chin to the arch of the pubis, if practicable; if not, let the forehead come, and do our best with it.

Face presentations are accidents; and, perhaps, they are so unlikely to happen, in consequence of the normal law of fœtal flexion, that they ought to be regarded as examples of preternatural labor. Yet, when we come to reflect that the female can generally expel the child with but little more difficulty, in this case, than in vertex positions, it seems altogether proper to regard them as natural cases. But I have said that they are accidents, and I believe that they are accidents caused by deviations of the axis of the womb. I beg leave to repeat that, if a female have a very great right lateral obliquity of the womb, and the vertex present towards the left side of the pelvis, it may be impelled against the brim in such a manner as to glance above it, and allow the forehead to fall into the opening, which state could not exist long without being followed either by the descent of the face, or the inducing of a shoulder presentation. It should never be forgotten that, from the chin to the vertex is a distance of five inches, which none of the diameters of the straits will take in, in the living subject: therefore, if the vertex should rise above the brim, and let the forehead fall into the opening, the chin would gradually come down. Let not the Student then expect to find the face looking full down into the excavation, at the beginning of these cases; but rather, let him expect to find it coming more and more completely down as the labor draws to its close; hence, all face cases are at first cases of forehead presentation, and, whenever the chin departs from the breast in a labor, let him take heed lest it lead to a face presentation.

I propose to the American Student to adopt Dewees's recommendation, to have only two face presentations, and to let the first be that in which the forehead is to the left, and the chin to the right side of the pelvis—while the second position is that in which the forehead is to the right, and the chin to the left side of the pelvis. Let this be the decision; and let the Student, when he finds the chin disposed to address itself to a point in rear of the transverse diameter, still consider it as a first position, or a second position, as the case may be.

Suppose a case of face presentation to be caused by a right lateral obliquity of the womb, the point of the head being repelled above the edge of the strait: the womb, in its oblique state, leans to the right and *forwards*, and not directly towards the right; whence, if the accident occur in the manner supposed, the chin could not fail to be placed to the right, and a little forwards; the same thing is true of cases caused by left lateral obliquity—*mutatis mutandis*—as before stated. This furnishes a striking manifestation of the wisdom which, in giving form to the pelvis, even provided us herein a remedy for the accidents that might occur to thwart or prevent the parturient act. Should the chin be towards the posterior part of the pelvis, and not susceptible of being directed towards the front of the pubis, the most serious mischiefs might be expected to occur; whereas, when the chin advances toward the pubis, little embarrassment is, in general, to be apprehended.

If we could know, antecedently to the descent of the presenting parts, what they are, it might be supposed that we could easily restore them when wrongly placed, to their proper situation; but, while the presenting part of the child is above the brim, it is very rare, if not indeed impossible, to have such a good degree of dilatation as to admit of the hand being introduced, in order to effect the needful changes. The womb opens as the part comes down, and only as it does come down. Hence, when a face case is ascertained to exist, it is mostly (I say not universally) too late to return it into the abdomen or superior basin; and as to attempting to bring down the vertex, after the head has once sunk well into the excavation, I regard it as a rash, if not an impossible operation; rash, since it could not be done without very great violence; and generally impossible, since we cannot turn or see-saw a diameter of full five inches in a pelvis furnishing less than that space. Where it is possible to push the whole mass back, and bring down the vertex, let it be done, if deemed really necessary; but the opportunity to do this good action will rarely occur in practice. Viardel tells us that, in Sept. 1669, he was called to Madame Nissole, who had been already two days in labor with a face presentation. He made use of a compress, with which, thrusting upwards with the fingers, he pushed the face, *i. e.* the head, back again; and so enabled him, after he had raised it up, to slide his hand along the face until he got hold of the vertex, which he pulled downwards, and thus restored the chin to the breast, placing the head in *extension.* Viardel boasts of this case—but it is doubtful whether he could have pushed the head back if it were already out of the womb at the time of his arrival. And if it were not yet in the vagina, he did an imprudent act of meddlesome midwifery in his operation. He relates the case at p. 110 of his *Obs. sur la Prat. des Acc.*

Dead, and half putrid children, in whose tissues there is scarcely any resiliency or resisting power left, are not so unapt to come face foremost as living children, in whom departure of the chin from the breast occasions such a great extension of the head as to be painful, whence the living child instinctively opposes the wrong tendency, by acting with all its strength, to get the chin down, or the head flexed again.

Let me repeat that it is not to be expected that, at the very beginning of a labor, the face of the child shall be found looking directly downwards. When the examination is made early in a labor, the os uteri being dilated very little, the accoucheur ordinarily rests content with ascertaining that the head presents, and does not endeavor to complete the diagnosis as to position. Hence, there is almost always an early mistake in the diagnosis and prognosis, for it is the forehead that is first felt; and the face itself does not appear in the excavation for some time after the commencement of the parturient throes. The head turns over only by degrees, and allows first one eye to be felt, and then the other, the nose, the mouth, and the chin. In order to exemplify these processes, I shall cite some cases from my record-book.

On the 5th day of February, 1830, I was called to attend Mrs. ——, in labor with her second child. When I reached her house, it was half past six o'clock in the morning. She told me that she had had pain for a day or two, but was seized with regular labor-pains at four o'clock this morning. Upon making examination per vaginam, I found the os uteri from one inch and a half to two inches in diameter, with the edges thin and ductile, and the very tense membranes protruding through them during the pains. I could, at first, just feel the even smooth surface of the fœtal cranium, which seemed to be resting or lodged upon the top of the symphysis pubis, and not in the least degree *engaged*, or entered into the superior strait; this was all that I learned from this first examination, and was all that I wished to learn.

As the pains were regular and good, I expected soon to find the head engaged within the passage; but I observed that the uterus was very large, as if distended with an undue amount or excess of liquor amnii.

At nine o'clock A. M., the pains, although regular and of increasing severity, had not caused the head to engage in the slightest degree; it remained exactly as at the first Touching. These circumstances led me to suspect that the womb was unprovided with a proper degree of energy, on account of its being distended beyond its just dimensions. I deemed it, on this hypothesis, advisable to rupture the ovum, in the expectation that, as soon as the womb should condense itself a little by the flowing off of the waters, it would acquire such vigor as to compel the head to engage in the strait, and thence pass speedily into the excavation, as I had repeatedly observed to be the case in other persons.

Upon rupturing the ovum, there came off a very great quantity of water; I should think nearly two quarts in all; but the head did not advance until three or four pains had acted upon it; after which it came slowly down, and I felt a suture; but as yet no fontanel was distinguishable. The examination induced me to suppose it was a vertex presentation of the first position, in which opinion I was most egregiously deceived, in consequence of the very careless manner in which I made the investigation. At eleven o'clock, I made a more careful inquiry, and was distressed to find that the left side of the os frontis was in the middle of the excavation, and that, by passing the finger very strongly up towards the left sacro-iliac junction, I could feel the edge of the left orbit and root of the nose, beyond which it was impossible for me to reach, in the then state of the organs of generation.

It seemed, on account of the advanced state of the labor, too late to turn, even if that could have been considered the best resource; and I was the more averse to such a proceeding, considering that I had before delivered her of a large child, and also that the waters were now drained off, and the uterine contractions powerful.

As she had by this time become heated, and very much disquieted with her pains, from which the suffering was severe, I gave her thirty drops of laudanum, and soon afterwards took twelve ounces of blood from the arm. She also got an enema of flaxseed tea and olive oil.

The head was now fairly engaged, and the face was becoming more and more the presenting part, notwithstanding my repeated endeavors to push it up, by forcibly pressing against the ossa malarum during each pain; and I became thoroughly convinced that it was impossible to force up the face and bring down the vertex by the employment of any legitimate force, or by mere dexterity.

The pains had become so dreadfully severe, and the poor woman suffered such agonies, that I really entertained serious apprehensions that the womb might rupture itself or the vagina, in its vain efforts to carry on the parturient processes, lashed as it was into a rage of excitement by the obstacles to delivery.

At my request, Dr. James, at that time Professor of Midwifery in the University of Pennsylvania, was invited to see the patient, and arrived at two o'clock in the afternoon; and after having examined the case, left me, with encouragement to hope that the vertex might come down after some further efforts of the womb. Dr. J. was to return to me at half past four o'clock.

In the mean time, I provided myself with the long right-hand blade of Davis's oblique forceps; and when the professor returned, at four o'clock, it was found to be vain any longer to expect the descent of the vertex. I therefore introduced the blade above mentioned behind the right ramus of the pubis, got it upon the left parietal bone, and, using it as a vectis, drew down with it during the pains. The head advanced very much by this aid, and began to press upon the perineum; but there it stopped, and seemed no longer affected by the vectis.

I next attempted, with my Baudelocque forceps, to introduce the male blade behind the left obturator foramen. I was foiled, but Dr. James succeeded in adjusting it. Every attempt to adjust the female blade, whether made by Dr. James or by me, proved fruitless. They could not be made to lock; nevertheless, I rashly attempted to deliver with them by securing the joint with one hand, and by this means the head again advanced, but soon stopped. The forceps were now abandoned, after vainly attempting to make them lock. I next resorted to the oblique vectis again, and with it caused the head to advance so much, as to put the perineum in a state of tension. The chin turned to the pubic arch, and then emerged from the genital fissure; and as the successive portions of the face came forth, the chin rose up to the mons veneris, and allowed the fourchette to slip backwards off the vertex, which immediately retired towards the coccyx.

The child was born, but the cord, which was tight around its neck, did not pulsate; the infant, however, began at length to gasp, and after having been well dashed with brandy, cried lustily. It was born at half past six o'clock P. M., so that the labor was found to have continued about fourteen or fifteen hours.

At the time I last put on the vectis, the child's chin was in the left sacro-iliac corner of the pelvis. Both Dr. James and I expected that the rotation would inevitably carry the chin to the sacrum, to be consequently delivered at the perineum. I have every reason, therefore, to suppose that the vectis was the chief means of giving the head so favorable a rotation, a result attributable to the admirable curve of Dr. Davis's oblique blade.

The perineum was not hurt; the placenta came off in twenty minutes, and the mother found herself very comfortable, considering her great fatigue.

The face was one enormous suggillation, carried to the extent of producing numerous blebs or vesications on the eyelids and cheeks. The mouth was excessively swelled, and the left eye completely closed. The face was, on account of this state, directed to be frequently bathed with cream. This infant was carefully weighed on the evening of its birth, and was found to weigh nine pounds and three-quarters. On the sixteenth day after delivery, the woman was down stairs to dinner, and had no subsequent indisposition.

In giving the details of this case, I am liable, as I well know, to the charge of having, in an important matter, anticipated my subject: but although I have not yet come to the formal consideration of instrumental cases, I feel pretty well assured no evil will happen to any Student for having, by reading the foregoing relation, in some degree anticipated the regular and formal consideration of obstetric operations.

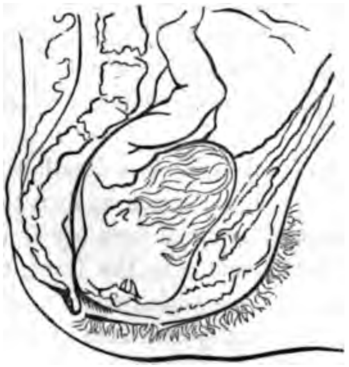
The cut, Fig. 88, which represents the fœtal head, in a face labor, thrown back to that degree as to press the occipital bone against the interscapular space, suffices to show how well founded were my fears lest the forehead, instead of the chin, should rotate to the front, to prevent which is the chief doctrine of this obstetric topic; and I would again urge the Student to take the first opportunity that may present itself, of testing the doctrine, by trying to deliver on the machine, or *phantome*, with the chin backwards, in a face presentation. By so doing, he will at once have a demonstration of the point of practice to be adopted, and never afterwards be in the least danger of making a mistake, or committing a blunder in this matter.

Seeing the great and merited reputation of the late Professor Dewees, of Philadelphia, and the general recourse to, and reliance on his obstetric precepts, I feel constrained to warn the Student of one error in his *System of Midwifery*, 2d edition, 1828. He is speaking, at p. 328, of the instrumental delivery of a face-labor.

"Should the forceps be determined on, we must apply them over the ears; that is, one blade behind the pubis, and the other before the sacrum; they must be so applied that the concave edges must look towards the hind head, which must be brought under the arch of the pubis, and not the chin, as directed by Smellie."

This operation would inevitably, if successful, bring the top of the forehead and the crown of the head under the arch, and the chin to the sacrum and the coccyx, as in Fig. 88. To deliver it, would imply that the child's throat should stretch to a length beyond eight inches, or that the thorax and head should both be in the excavation together. I should not have noticed this lapsus of my celebrated townsman, but as evidence of my respect for his great reputation, and because I know that it was a *lapsus pennæ*, and not a precept that he would follow in practice. When such authorities happen to fall into even a small error, it is proper to point out the error, lest an accidental error with the authority of a great name should mislead the early beginner, or Student.

Fig. 88.



I should think no long disquisition would be required to convince the Student who will carefully examine the Fig. 88, that, in a face presentation with the forehead to the pubis, and the chin to the sacrum, it must happen that a considerable part of the child's thorax shall be jammed, together with the cranium, into the pelvis. The same cut shows that if the occipito-mental diameter be reversed, so that the mental extremity of it, instead of the occipital extremity, enters the pelvis first, it must leave it first, for it cannot be reversed within the excavation. Further, let the Student examine the drawing, to see how the chin must in these unfortunate presentations slide down the posterior surface of the pelvis, from the promontorium to the point of the coccyx, and so over the perineum, until it escapes from the vulva, over the fourchette. In examining Fig. 84, he will readily perceive how easy it is in that case for the mental extremity of the oblique diameter to begin to escape, since it has only a slide of one inch along the symphysis pubis to make before it emerges; whereas, in the reverse position, it slides seven or even eight inches, over bone and resisting tissue, before it can begin to be born.

A case of a different kind occurred to me on Wednesday, the 17th of February, 1830. Mrs. M. was in labor with her seventh child, having been taken at four o'clock A. M. with the pains, which continued to increase up to the time when I arrived, which was about half past six o'clock. The pains were strong; the waters gone off; and the head pretty low down in the pelvis. At my first examination, I mistook the presentation, thinking that it was a vertex case; but, as the pains seemed to have no good effect, I examined again, and could feel the root of the nose *directly* behind the symphysis pubis, and the superciliary edges of the orbits upon each side of the symphysis of the bone.

Upon this discovery, I endeavored to turn the forehead towards the left, by raising the os frontis, and pushing it in the proper direction; but as soon as each pain came on, it forced the presenting part back again into its former position. I next endeavored, by simply pushing up the forehead during the absence of a pain, and sustaining it while the pain was active, to cause the vertex to descend along the curve of the sacrum, and on to the perineum: but I could not succeed here any better than in my attempts at rotation: the pains drove it back, maugre all my wishes to the contrary. As the chin was so far departed from the breast, I had good reason to fear that the head must turn quite over in extension, and thus give me a face case to manage; for, as I could feel the superciliary ridges on each side of the symphysis pubis, there was some likelihood of a complete overset of the head, provided the cranium was not too large.

The patient, who had met with no such difficulties in her former labors, and to whom I was a stranger, now became greatly alarmed and distressed; so much so, indeed, that I judged it most prudent to explain to her the true situation of affairs, and encouraged her to look for relief after a reasonable time. I told her that she could be delivered by her own unassisted efforts, but that it would take a good deal of time and much pain; but that I could speedily deliver her with the help of an instrument, which would add neither to the hazard or pain of her condition. She clapped her hands, trembled violently, and uttered exclamations indicative of the greatest dismay, and even terror, but at last agreed to be guided by my opinion.

I introduced the right-hand long blade of Davis's oblique forceps, with which I caused the head to make a considerable advance; but it again stopped, and I applied the Baudelocque forceps: with the aid derived from this instrument, I drew the head downwards so as greatly to extend the perineum; upon observing which, I deemed it prudent to remove the forceps, lest I might rupture the perineum, which was about to undergo, unavoidably, a very great distension, and which I was not inclined to augment too rapidly. After removing the forceps, I reapplied the vectis, as before, and it very greatly assisted me to bring the head onwards as far as was requisite. As soon as I withdrew the vectis, a pain came on, by which the head was expelled, the vertex passing out over the fourchette, upon which it immediately completed its act of extension, and allowed the crown, forehead, nose, and chin successively to escape under the pubic arch. The child was born alive, and the after-birth followed in ten minutes. Upon the infant's forehead was an enormous black suggillation, which disappeared in the course of a few days, and was followed by no inconvenience.

Of the above case it is proper to remark that the mother was very well formed, and the pelvis large; the child of medium size; and although it did not become actually a face presentation, but was rather a case of presentation of the forehead, it still serves to illustrate my observations on the difficulty of converting face presentations into those of the vertex. I think that, but for the aid of the instruments, it must have at last brought the face from behind the top of the symphysis pubis to look fully down into the excavation; for the difficulty of bringing down the vertex, although not insuperable, was exceedingly great. Perhaps the labor would have been easier, had I turned the head quite over! In some small heads, I have pulled the chin down, and let the vertex rise; but this can only be done where they are small. In the course of my practice, I have met with a considerable number of cases like the one whose relation I have just given, but it seems unnecessary to cite them here, as I presume this one may suffice to explain the nature of the mechanism of such a labor.

I find, in my case-book, another example of face presentation, which I shall not deny myself the privilege of laying before my reader in this place, because it offers good encouragement to those who may happen to meet with such untoward sorts of labor in the commencement of their practice.

October 11th, 1830. Mrs. C. W., aged twenty-six, was in labor with her first child. I was called at twelve o'clock at night. She had been poorly throughout the day, but kept about until bedtime. At ten P.M., had a violent pain, and large discharge of waters. She lay on her left side. Upon Touching, I could not reach the os uteri, nor feel any part of the child. Upon causing her to turn on the back, I was enabled, by pushing the finger very far upwards and backwards, to hook the anterior lip of the os uteri, and draw it, by means of the finger, downwards and forwards, into the centre of the plane of the upper strait: I could then touch the child's cranium, but I could not touch a sufficient portion of it to learn what part of the cranium it was. Not long afterwards I felt, in the left anterior part of the upper strait, a ridge or edge, which I soon made out to be the superciliary edge of the orbit of the left eye, the globe of which soon came within my reach. I could not touch the anterior fontanel.

Here, then, was a case which, like that just now related, was to become a face presentation at last, if I should prove unable to prevent it by failing to restore to the head its lost flexion. I vainly tried to do this by pushing up the forehead, and holding it up during a pain. It always came back to its place, in spite of whatever efforts I could make. I next introduced the whole hand, except the thumb, took hold of the vertex by a fair purchase, but could not turn it downwards; and at length, becoming convinced of the impossibility of succeeding, resolved to abandon such irritating interference.

As the head sank lower and lower, there was an obvious tendency of the chin towards the left sacro-iliac junction. I opposed this movement of the head by pressing the finger on the left side of the nose, which kept it from turning to the left, and at last brought it to the obturator foramen. The face came more and more down into the excavation, and began to swell very much. The lips became excessively tumid, and the whole face at last felt like a tense bladder. By the force of the pains, alone, the chin was afterwards slowly brought to the os externum, and applied itself to the top of the pubic arch, under which little by little it emerged, and then rose up towards the mons, permitting the front of the throat to take its place under the arch, and thus allowing the vertex to escape last from before the fourchette. See Fig. 86, p. 380.

The placenta came off in six minutes. The infant was very weak, and its face greatly swollen, and black with the suggillation. It soon cried loudly, and I found that on the 14th, that is three days after its birth, it was in fine health, and without any swelling of the face. The mother had a very favorable getting up. The net weight of the infant was nine and a half pounds. The mother was a large and very powerful woman.

Madame Boivin informs us, in her *Mémoires sur l'Art des Accouchemens*, page 276, that, out of seventy-four cases of face presentations, fifty-eight children were born naturally. Of these, forty-one were delivered without any assistance, and seventeen, by restoring the vertex to the centre of the excavation; a success almost incredible. Fourteen cases required the turning and delivery by the feet, while only two were extracted by the forceps, and in one of the latter cases the mother had convulsions.

"Thus," says the learned lady, "although presenting by the face, the child may be born alive and naturally, provided the head be not too large, if the parts of the mother are well formed, the pains strong and good, the woman resolute and healthy, and no accident occur during the course of the labor."

Madame Lachapelle, whose vast experience, gained while at the head of the Maternité Hospital at Paris, gives her valid claim to speak as with authority, and whose thorough knowledge of the theory of midwifery must confirm those claims as rights, gives us only two sorts of face presentations: one in which the forehead is to the left and the chin to the right of the pelvis, and the other in which the forehead is to the right and the chin to the left. She says she never met with Baudelocque's first and second positions. Dr. Dewees, who asserts that his list comprises near nine thousand labors, also informs us that he never met with them. It will be remembered by the reader that the second case which I related in this chapter, that of Mrs. M., was one in which I felt the root of the nose behind and above the symphysis, and the two orbits on each side of it; and he will admit that, although the vertex was at last restored so as to escape first, yet this was a real example of a face case of the rarest occurrence. Smellie gives us at least four examples of the face presenting in Baudelocque's first or second position; and assuredly no English or American Student of Midwifery will be disposed to call in question the accuracy or candor of that admirable author, notwithstanding that Madame Lachapelle tells us she finds no very evident examples of such face positions in any good collection of cases.

For my own part, I do not perceive the great importance of dwelling with much emphasis upon all the possible positions of the face. It cannot be doubted that they are each possible, inasmuch as, where the child's head is not disproportionately large, the mass of the head is observed to rotate upon the cervical axis, as I before remarked, sometimes threatening to carry the chin towards the sacrum, and sometimes flattering the accoucheur with the prospect of its speedy arrival at the pubis. The more important and useful knowledge is that which teaches us the nature of the accident, and the appropriate indications of treatment. But we have already seen that the accident consists in an excessive departure of the chin from the breast, or failure of flexion; that is the first principle: and that the chief indication founded upon it is to restore the flexion by pushing up the forehead and bringing down the vertex; and where that cannot be done, the next indication is to rotate the chin to the front, so that flexion may take place as soon as possible after the chin has emerged.

I am not capable at present of stating the number of face cases I have had occasion to treat. The number has been considerable. The result, as to its influence on my opinion, is that they are rarely formidable when the great precept of bringing the chin to the pubis is understood and can be fulfilled. Certainly, I have not been, in a majority of my cases, called upon to use any extraordinary measures of relief.

I have a word of counsel for the Student as to the care of his own reputation in the conduct of such cases. There can rarely be met with a more disagreeable spectacle than that of a new-born child's face, after a bad face-labor. It is frightfully suggillated, and often covered with blebs filled with yellow or bloody serum: the lips are completely in a state of ectropy, the eyes closed by infiltration of the palpebræ, and the nose enormously swollen. Bystanders cannot comprehend why these appearances should exist in a neonatus that has been tenderly treated—and are therefore too apt to assign as the probable cause the rudeness and brutality of the medical man. As soon as the young beginner has surely made his diagnosis, let him announce the probability of a swollen and blistered face, notwithstanding the gentleness of the treatment which he is about to administer. In this way he may save and augment not only his own credit, but that of his art, a pleasing duty for every true scholar.

As I shall have occasion to revert to the consideration of face-positions when I come to treat of the various uses of the forceps, I shall close the present chapter, in order to take up the consideration of those labors in which the child presents the breech, knees, or feet, when descending.

CHAPTER XII.

ON PRESENTATIONS OF THE PELVIC EXTREMITY OF THE FŒTUS.

As the length of the gravid uterus, at full term, does not exceed twelve inches, and as a well grown fœtus is nineteen or twenty inches in length, it is evident, as I have already said, that it must, while in utero, be folded up in a very compact form, and that it will be an oval body, one of the extremities of which ought to be directed towards the orifice of the womb, and the other to the fundus. The most natural position of the fœtus is certainly that in which the head points downwards; so that the vertex, or some other part of the head, may, in labor, advance first. But it happens that about one in every forty-five or fifty cases presents the other extreme of the ovoid to the os uteri; and, in doing so, it is a matter of mere chance whether the breech, or the knees, or the feet, prove to be the presenting part. In strictness, the breech ought to descend first in these labors, but if the feet happen to be near when the membranes give way, they are quite likely to fall into the opening, and pass, soon afterwards, out at the vulva; so that, supposing the breech presentation to be, after that of the vertex, the most natural, we may properly include, in the account of the presentations of the pelvic extremity, those of the knees and feet, and regard them as mere accidents of the pelvic presentations, and all to be included under the head of natural labors, agreeably to the doctrine expressed in a former page of this work—a doctrine that announces two essential presentations of the fœtus, one a cephalic, and the other a pelvic presentation; each of them is liable to the accidents appurtenant to their form.

It is not an easy matter to determine why the breech presentation occurs about once in forty-five or fifty labors, and it is far less easy to say what is the reason that certain women are prone to this sort of labor to such a degree as to bring all their children so. I knew a woman whose children, four in number, were all born with the breech presentation, and it is by no means very rare to meet with persons who have been similarly situated in more than one of their labors. Dr. Collins, of Dublin, in his *Practical Midwifery*, informs us that one woman who was delivered at the Dublin Lying-in Hospital had preternatural presentations in every one of her labors, and she had given birth to nine children. While that gentleman was master of the Dublin Hospital, sixteen thousand four hundred and fourteen women were delivered, of whom three hundred and sixty-nine had presentations of the breech, feet, or knees; making rather more than one such labor in every forty-five cases. Out of 54,723 labors stated by Boer, Bland, Merriman, Boivin, Lachapelle, and Nægèle, there were 1694 cases of breech, feet, or knee presentations, which give us one pelvic presentation in thirty-two and one-fifth cases nearly. It is commonly assumed that about one in forty-eight, or more generally two in 100 cases will prove to be pelvic presentations.

Causes of Pelvic Presentations.—The causes which produce these presentations must be purely accidental. The most natural presentation is that of the head, which is turned towards the os uteri from the earliest period of pregnancy. The insertion of the navel-string is nearer to the pelvis than to the head of the child, the head therefore hangs downwards; but when the cord, by the growth of the ovum, has become of a very considerable length, the child ceases to be dependent from it, for the cord is not unfrequently from twenty to thirty inches long. It seems very probable that while the fœtus is yet small, it may change its position in the uterus; but if it happen to turn as late as the fifth month, it will be apt to retain the attitude it may then acquire till the end of the pregnancy, as its length does not admit of its changing again very readily after that period. It is not to be doubted, however, that the attitude may, by certain extraordinary or violent movements of the mother, be reversed, at a later period, so that the head, which was originally at the os uteri, may be afterwards brought to the fundus, and *vice versâ*.

Some persons will not agree with me in regarding the pelvic as a natural labor; yet notwithstanding the breech presentation is met with only once in forty-five or fifty labors, I am not inclined to regard it as a preternatural case, for I cannot discover any reason for classifying it along with that sort of births, in the mere fact that the head does not present. The breech composes one end of the fœtal ovoid; and a breech labor requires, for its complete success, no greater dilatation than that demanded for the passage of the head; it may be effected without any aid, and is, perhaps, not really fraught with greater danger for the mother than the other, the common vertex presentation. It is, however, far more dangerous for the child than the vertex case; and as the object of parturition is the safe birth of the infant, it might be absolutely proper to include, in the class of preternatural labors, all those in which the child is exposed to unusual hazard. Still, many breech presentations terminate favorably with great celerity and without any artificial aid, whence I look upon them as not really preternatural.

In former times these presentations of the pelvic extremity of the fœtus were regarded as much more serious events than they are at the present day.

The ancient Romans used to call all those persons that were born by the pelvic presentation Agrippas, as is seen in the following passage from Pliny, lib. vii. cap. viii.; and all such labors were regarded as not natural.

"In pedes procedere nascentem contra naturâ est, quo argumento eos appellavere Agrippas ut aegré partos; qualiter M. Agrippam ferunt genitum unico propé felicitatis exemplo in omnibus ad hunc modum genitis."

If the birth of Marcus Agrippa were really the only instance of a safe delivery of the child in a breech presentation, we should not have occasion of surprise at Pliny's opinion as to the preternatural character of such labors; but, doubtless, thousands of Roman children must have been safely born so, and that without any assistance in the birth.

That sprightly and most delightful old book—the first Midwifery book ever printed in England—I mean the "Byrthe of Mankynde," by Thomas Rainald, Lond., 1565, at Fol. liii., has the following:—

"Agayne, when it proceedeth not in due tyme, or after due fashion, as when it commeth forth with both feete, or both knees together, or els with one foote onlye, or with both feete downwards, and both handes upwardes, other els (the whiche is most perillous) sidelong, arselong, or backlong, other els (having two at a byrth) both proceade with theyr feete fyrst, or one with his feete, and the other with his head, by those and dyvers other wayes the woman sustayneth great dolour, payne and anguishe."

Thomas Rainald would be very much surprised and comforted could he see what facilities modern science has provided for the obviation of all these terrible occurrences.

The danger to the child, here, depends on its liability to asphyxia, from several causes: first, from the compression of the cord, which is pressed betwixt the child and the parts from which it is escaping; second, from the detachment of the placenta before the head is born, by which the uterine life of the child is destroyed before its birth; thirdly, the compression of the placenta itself betwixt the uterine parietes and the head of the infant; or fourthly, the constriction of the placental superficies of the womb, during the time that the child's head, still remaining in the vagina and lingering there, ceases to distend the uterus, which closely contracts on the after-birth, and even though still retaining its connection with it, yet suspends all the utero-placental operations, on which the fœtus depends for existence antecedently to the establishment of its respiration.

The last named cause is, I presume, the one chiefly to be feared; and I have long deemed the pressure upon the umbilical cord, in breech cases, a matter of small moment as to the child's security, in comparison with the asphyxiating influence of the compression, detachment, or constriction of the placenta by the reduction of the superficial content of the placental seat. It is probable that that seat, which is eight inches in diameter before the commencement of the labor, is diminished to a diameter of four or even perhaps three inches by the time the head is driven out of the womb into the vagina in breech-cases. Under such a reduction, no valid placento-uterine intercommunion can be supposed possible.

The breech may descend into the excavation, and it may even pass through the vulva, without the least danger of compressing the cord; but when the body of the child has sunk so low as to bring its navel down into the bony pelvis, there is little danger that the arteries of the cord shall be completely obstructed for a period long enough to give the child a fatal asphyxia. Such an event is far more likely to occur where the feet present than where the breech advances; because, in the latter case, the thighs, and generally the legs, are extended along the front of the body in such a manner as to protect the cord from pressure, its vessels being fully guarded by its position betwixt the thighs, during all the time the body is escaping; thus enabling the infant better to bear the temporary pressure on the cord for the short time it must be compressed by the head only, while that part stops in the excavation; longer pressure by the head would easily extinguish the remains of a life that was already about to expire from preceding obstruction of the circulation. In general, the danger for the child is not great until the head has sunk down into the excavation, because it commonly does not take a great deal of time for the whole of the body to pass through the dilated canal of the vagina; but the head, being subject to arrest while in the passage, may then fatally compress the cord betwixt itself and the bony sides of the pelvis.

We know that the prolapsion of the cord, in an ordinary vertex labor, is very apt to occasion the death of the fœtus; and it is therefore easy to perceive that such compression of the cord, between the fœtal head and the pelvis, is here the real cause of the loss of the infant. From this we might naturally suppose that those children that are lost in breech and footling cases are lost from the same cause, to wit, a compression of the cord. But I believe, upon evidence, that the placenta is often detached as soon as the head or breech leaves the uterine cavity; and if so, then the child is rather lost from the suspension of the placento-fœtal circulation by the aforementioned detachment, than from the compression of the cord only.

Fatalities in Breech Cases.—I think it probable that more than one child in every five that presents by the breech, or feet, or knees, perishes in the birth. Certainly, if we may judge from what Pliny says about the Agrippas, in the passage quoted but a little while ago, the highly civilized people of Rome, and probably the ancients in general, looked upon these labors as replete with danger, and hence, if four out of five children born in this manner escape with life, such a success is as much as we ought to expect—all the world over. In large lying-in hospitals, perhaps, the proportion of fatal cases is rather less unfavorable, in consequence of the prompt attention always paid in such establishments to the parturient female, and to the greater skill and dexterity acquired by abundant opportunities of practice. Of Dr. Collins's cases, 369 in number, of breech, feet, and knee presentations, 234 were born alive, and 135 were born dead—some of which were putrid, premature, &c.

In Dr. Cazeaux's *Traité Théorique et Pratique de l'Art des Accouchemens*, a work published in Paris in 1840, and which is said to enjoy the very highest favor in France, there are the following remarks upon the subject of the danger to the fœtus in pelvic presentations. I translate it, as containing a late novelty upon the subject. "Delivery by the pelvic extremity is very dangerous for the child. The statistical results furnished by Madame Lachapelle prove that, out of eight hundred and four presentations of the pelvic extremity of the fœtus, one hundred and two children were born feeble, and one hundred and fifteen were born dead. The proportion of dead children to the whole number is one-seventh; whereas, in 20,698 vertex positions, there were only 668 dead born; which is one in thirty, or about one-thirtieth. As to the prognostics of the several sorts of pelvic presentations, it has been remarked that, when the breech comes down first, the number of dead born is about one to eight and a half, which is about an eighth and a sixteenth. In footling cases, one out of six and a half die, a sixth and more; and lastly, for the knee cases, one out of four and a half."

M. Cazeaux goes on to say that the above is not a fair representation of the dangers to the child in these cases; for these results do not exclude those cases of dead born that are not properly assignable to the presentations as causes of the death; the statements ought to exclude putrid fœtuses and deformed children; and he states, as the opinion of M. P. Dubois, that, "setting aside all the cases in which the children appear to have been lost from causes not connected with the presentation, M. P. Dubois has arrived at this result, that in labors with footling presentations, there dies one child out of eleven, whilst in presentations of the head there dies one out of every fifty. It is plain that the difference is frightful."—P. 359.

Diagnosis.—It is a question whether the nature of the presentation can be discovered by reference only to the movements of the fœtus in the latter stages of gestation. Some persons have foretold that the child was improperly placed, judging it so to be by feeling a greater degree of motion in the pelvic region than in the upper part of the uterus. It seems not difficult to believe that, if the motions of the child should be chiefly felt towards the cervix uteri, they ought to be accounted for by referring them to the presence of the feet in that quarter. However, I feel assured that those patients whom I have attended, and whose labors were accompanied with this presentation, were in general utterly unsuspicious of it in pregnancy; and they are, commonly, ignorant of it until the child is born. It is not rare, indeed, for women to fear that the child is to be born double, as it is called, when the vertex really does present; and some patients are quite convinced the child is wrongly placed, until labor comes on to prove their fears ill founded. There may be some certainty obtained by a diagnosis derived from the stethoscope applied to different parts of the uterine region; for, if the child's head be directed towards the fundus uteri, there will be heard, in consequence, a pulsation of its heart at a higher level than if the head occupy its more natural position—probably near the navel; but there will always remain some liability to wrong impressions, if they be derived from auscultation alone. The surest way is that of the Touch, which is scarcely to be confided in except at the commencement of labor, or at a period when the presentation can be touched with the tip of the finger.

When the breech can be reached per vaginam, it ought to be recognized by its mass filling up the pelvis; by its softness, and its fleshy feel, so different from that of the fœtal head; by the tubera ischii; by the point of the coccyx, the anus, and the organs of generation, male or female; by the spines of the sacrum, and by the sulcus found between the nates and the thighs, which tend upward from the presenting part; I may add, also, by the meconium, which is often discharged at a pretty early stage of labor, and comes away with the waters on the hand of the accoucheur: but let not the young accoucheur be deceived by this symptom, since it is possible for portions of the meconium to come away even in the best vertex position. It is also to be observed that the form of the bag of waters is commonly not so much like a segment of a sphere in the presentations of other parts than the head. In breech presentations, it is more like an intestine in shape, sometimes descending to the very orifice of the vagina, and yet not very considerably dilating that passage.

Notwithstanding we ought to be able clearly to distinguish betwixt the breech and the head presentations by the first touch, it is, I think, not very uncommon for us to make a great mistake, if I may judge from the instances of mistakes that have come under my knowledge; but I am sure that such errors are the results of mere carelessness, and they could therefore always be avoided. Let it not be here understood that, when the true nature of the presentation is known, it ought to be communicated to the patient; on the contrary, it should be carefully concealed from her, as not calculated to promote her easy deliverance, since she attaches to the circumstance the idea of greater suffering or danger, which, by depressing the powers of her mind, would be very apt to affect, in an injurious manner, the pains or the voluntary efforts that she ought to have in their greatest vigor. While the nature of the case, then, is carefully concealed from the patient, it should be formally announced to her husband, or to some responsible person, and all the hazards of such a situation for the infant should be explained, in order that, if any untoward incident should cause the infant to be still-born, no unjust imputations might lie against the candor, the skill, or dexterity of the accoucheur.

Not to bring down the Feet.—When the breech is found to be the presenting part, it is very natural to suppose that, could the feet be brought down, they would give us the command of the child, so that we could very greatly assist in its delivery; and this is quite true: nevertheless, it is bad practice to bring the feet into the vagina, except for some very well understood and sufficient cause. When the child descends *double*, as it is called, the parts yield very slowly for its advance, and this tediousness is a necessary consequence of its bulk, and the yielding nature of its substance: unlike the head, which is hard and firm, this part, when urged downwards by the pains, gives way before them, and is compressed so much that each pain is half lost in compressing the yielding mass before the part becomes firm or condensed enough to make it act as a dilater. This slowness is greatly to be deprecated; and all proper means to obviate it may be safely resorted to, such as a venesection, or the administration of a clyster or a dose of castor oil, &c.; yet this very slowness, and the great size of the breech, serve as means for the child's security, at the last moments of labor. By their means the os uteri, vagina, and vulva are so completely opened, become so absolutely cylindrical, and are so entirely deprived of the power of resisting, that, when the head comes to take the place of the body in the excavation, a very little force of the woman's straining serves to extricate it; or at least the complete dilatation enables the accoucheur to employ his hand or his forceps to extract the head in time to save the child from an asphyxia, which is almost sure to affect children that are not born very soon after the escape of the shoulders, and during the time the head is passing the vagina; for the placenta would be now so completely squeezed by, or even separated from, the womb, that the utero-placental functions must cease to be performed.

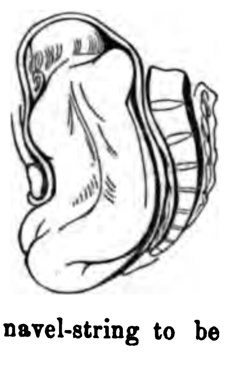
The impatience, which can scarcely be avoided when witnessing the throes of the mother or the struggles of the child, also exposes us to the danger of doing it a great harm by pulling strongly by the breech, shoulders, &c., in order to get both mother and infant the more speedily released; but if any one will take the time to reflect that the spinal marrow may be greatly injured by a violent extension of the neck, it will be evident to him that no very great amount of extracting force ought to be applied. It is best, therefore, as a general rule, to permit the breech to descend, and not in any manner to interfere with the feet until they are spontaneously born. Any extracting force has an invariable tendency to slip the arms upwards, so as greatly to embarrass the last and most important act of the breech labor. When the child is wholly expelled by the uterine contraction, it is pushed out of the womb in consequence of the approach of the fundus to the cervix of that organ. In that natural process, if the arms happen to be resting on the sides of the abdomen of the child, they ought to descend *pari* *passû* with the parts on which they rest; but if the child be pulled out, then, as the fundus uteri does not press with a proper power upon the head, the arms will naturally slip up over or along-side of the head, where they sometimes are so firmly fixed as to make it a very difficult matter to bring them down. Hence the soundest discretion teaches us to let the womb push forth the breech as we let it push forth the head, in vertex labors, without laying hold of it to drag it downwards as soon as the least purchase can be had on the presenting part.

The legs, in a breech presentation, may be turned upwards on the child's belly, or they may be flexed on the thighs, so as to bring the feet very near the nates. If the breech engages in the pelvis, or begins to pass the circle of the os uteri, the feet disappear, rising as the nates descend. There is no danger of injury to the hip or knee-joint, if the child be trusted to the natural powers employed for its birth or expulsion; but whenever much force is employed by putting the fingers in the groin, we do incur the hazard of breaking or dislocating the thighs.

Positions of the Breech.—The breech may have one of four positions: 1st, the child's back to the left acetabulum of the mother; 2d, to the right acetabulum; 3d, to the pubis; 4th, to the promontory. These several positions are easily discriminated in practice by the Touch, which ought not to mislead any attentive or considerate practitioner, since by the Touch it is easy to learn where are the coccyx, the tubera ischii, the genitalia, the sulcus betwixt the thighs, the sacrum, &c. &c.

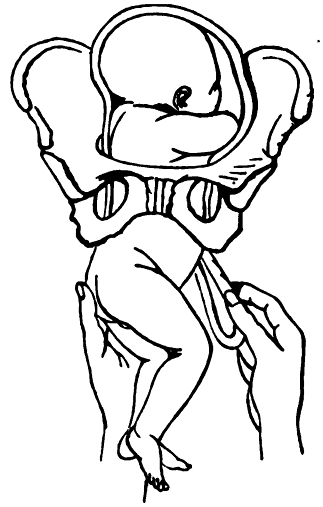
As the escape of the breech occasions a great distension, the perineum requires very steady support by pressing a soft napkin against it, for the purpose, first, of resisting its too rapid advance, and second, in order to give to its movement that curvilinear direction which ushers it into the world in a course coinciding with the line of Carus's curve. Figure 89 exhibits to the Student the appearance of bending which is acquired by the pelvic extremity of the trunk while passing outwards in a breech labor. It is manifest that the perineum may be here subjected to a great degree of distension. As soon as the body is so far born as to permit the navel-string to be reached, it is to be drawn downwards a little,

Fig. 89.



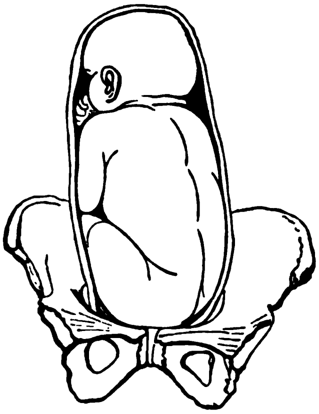
so as to free it from the danger of being broken off, or the other danger of a too early detachment of the placenta. It is easy to draw a considerable loop of it downwards by pulling at the yielding portion, as in Fig. 90. As soon as the feet are delivered and extended, they, as well as the body, should be wrapped in a napkin, in order that the skin may not suffer any injury, and also for the purpose of enabling the accoucheur to hold it more firmly, which he could not otherwise do on account of the viscous nature of the substances that adhere to it soon after it emerges.

Fig. 90.



First Position.—In the first position of the breech, the child's left hip should rotate to the left towards the pubis, so as to allow the sacrum to glide down along the left ischium, and the right hip to fall into the hollow of the sacrum. Fig. 91 shows the pelvic presentation *in sitû* before rotation, while Fig. 89, above, exhibits the appearance after the rotation has taken place. But after the hips are fully delivered, they recover the obliquity of their former situation, and the body continues to descend so, until the shoulders, entering into the pelvis in an oblique direction, come to rotate as did the hips; the left shoulder advancing to the pubis, as the hip did, and the right one falling back into the hollow of the sacrum. In Fig. 90, the right shoulder has come to the pubis and the left to the sacrum. When the shoulders do not come down well, a finger should be passed up so far as to reach above the one that is nearest, to depress it by drawing it along with the finger, which commonly suffices to cause the arm to escape. But if the arm does not descend readily, let the finger be slid along its upper surface to a spot as near as may be to the bend of the elbow, and then the elbow may be drawn downwards

Fig. 91.



by bearing down, let him endeavor to preserve the child from suffocation by passing two of his fingers upwards until they reach the two maxillary bones, and cover the nose; by doing this, the backs of the fingers, pressing the perineum backwards, serve to keep an open communication with the air, and the child can breathe very well until the tenesmus comes on. I have kept a child alive in this way, breathing and sometimes crying, for twenty or twenty-five minutes before the birth of the head, and thereby saved many a life that must have been lost but for this care. At last the head descends and escapes from the vulva very suddenly, after which, the placenta having been duly attended to, the delivery is complete; whereupon the patient may be put to bed.

Second Position.—The rule for managing this case is the same as that for the first position. Here the sacrum of the child is to the right acetabulum of the mother; the right hip to her left acetabulum, and the left one to her right sacro-iliac symphysis. As the presenting part descends, the right hip comes to the pubis, and the left falls into the curve of the sacrum.

Third Position.—Here the sacrum of the child lies behind the pubal symphysis—its right trochanter to the left ischium, and its left trochanter to the right ischial plane. In any such case, there will be rotation, converting it into one of the first or one of the second position, as accident may determine. It requires no further observation in this place.

CASE.—A few years ago, I was engaged to attend a young woman in her first child-birth. When she fell in labor, I discovered that the breech presented. Her residence was about three-fourths of a mile from my house. I was very much inclined to send for my forceps, for fear that when the head should come at last to occupy the vagina, I might be unable speedily to deliver it: but as she was exceedingly delicate and timid, and her friends anxious, I deferred sending for them lest needless alarm should be the consequence of bringing them to the house. The labor proceeded favorably until the shoulders were free, and then, notwithstanding the head took the most favorable position, I found no exhortations or entreaties sufficient to make the woman bear down, and the child soon became threatened with asphyxia, which I obviated by admitting the air freely to its mouth and nostrils, by pressing off the perineum, as before explained. The child cried from within the vagina, and I felt a hope that the forceps, which I now sent for, would arrive in time for its succor. The instruments were placed in my hands in the shortest time possible. In two minutes after I received them they were applied, and the head withdrawn, but it was too late to resuscitate the child. I have never since failed to order my forceps to be placed within my reach in any case of footling or breech labor, and I feel well assured that the consequence of this care has been the saving of several lives that must have been lost but for this precaution. I have lost but few children in pelvic presentation of late years. It is my invariable custom to order a forceps to be got in readiness as soon as I ascertain that the presentation is not one of the head; and I feel well assured that such a precaution, if generally observed, would preserve many a life that would be lost, either by delay in the delivery of the head, or by pernicious attempts to extract by pulling at the neck, to which the temptation is so strong in moments of great anxiety for both parent and offspring.

It is so unpleasant an event in the practice of Midwifery to lose a child in the operation, that the accoucheur ought to take all the precautions possible to free himself from reproach, which he shall scarcely escape, in consequence of the utter ignorance of the nature of parturition even in what is called educated or good society.

CASE.—On the 11th September, 1848, I visited a primipara lady in labor, at 7 A. M. She had been in sharp pain from 10 P. M., nine hours. The os uteri was not so large as the end of a finger. Upon ausculting and examining by palpation, I determined a pelvic presentation. At 12 M., I thought the labor would continue until morning, so slow was the dilatation; but at 5 the membranes gave way, and all the liquor amnii came off, the os uteri being still rigid and irritable. The bands of the upper os uteri were more tense and unyielding than those of the os tincæ proper. The child was still in health, as ascertained by the regular action of the heart. I had announced all the hazard for the child early in the day. My forceps was at hand; at 8 P. M. the head was thrust into the vagina, and, as I failed to deliver it with my hands, I applied the forceps and speedily drew out the head. The child was quite dead. There was no motion of the heart. When I drew down the feet, I found there was no vital tension in the limbs. Now I feel sure that this child perished by asphyxia from the unmitigated pressure of its placenta against the head consequent to the discharge of the waters. It perished of course before the operation. How could I, by any careful obstetrical measure, have saved it? I regretted, upon finding it dead, that I had not repeated my auscultations, after the rupture of the ovum. Had I done so, I should have been able to announce the loss of the child long before the midwifery operation became possible. I do not suppose that I am blamed by its friends, but a young accoucheur would feel less uncomfortable in such a case for having announced his prognosis. Hence, let the Student remember to auscult often towards the close of pelvic labors.

Fourth Position.—In those cases in which the sacrum of the child is directed towards the mother's back, it is highly desirable so to conduct the labor as to effect a complete rotation of the child by the time the head begins to get pretty low in the excavation. If this change does not take place spontaneously, or by the skilful interference of the accoucheur, it must happen, at the last and most important stage, that the face will be to the pubis, and then there will be some difficulty in obtaining the requisite dip of the head or its due flexion. It is exceedingly dangerous for the child to be so situated, but happily there is a method by which it may be hopefully assisted.

As soon as the shoulders are fairly freed from the vulva, the edge of the perineum tends to compress the neck of the child, and force it upwards against the arch of the pubis. In some cases, the perineum is so strong or elastic as to exert a considerable power in this way; and it is clear that, if it be not counteracted, the chin may be lodged upon the top of the symphysis of the pubis, which will wholly prevent the flexion of the head from taking place. For, if the perineum should press strongly on the nucha, it would push the front of the neck or throat hard against the symphysis, so as to prevent the chin from coming down. Under such circumstances, the child speedily perishes. The indication is to push the perineum back again, or carry the child far back towards the coccyx, and afford space enough to let the chin descend, either spontaneously, or by pulling it down, after introducing the fore and middle fingers of the right hand into the mouth. As soon as the chin is well brought down, the woman should use all her power to assist in the expulsion of the head. I have found that the best attitude for the mother, in this kind of delivery, is that which is advised for forceps operations, to wit, that in which she is placed on her back with her hips brought quite over the edge of the bed, the feet being supported by two assistants; so that, when the shoulders are delivered, the child may be supported almost in a vertical posture, as if standing, by the left hand of the accoucheur, while his right hand aids in the delivery of the head. I am sure that much greater command of the labor may be had in this position of the patient than in any other that can be devised.

But, as I have already observed, we should always endeavor to manage the case so as to get the face into the hollow of the sacrum, instead of letting the chin come to the pubis. If, therefore, the breech sink into the excavation in this unfavorable manner, we should, by pressure with two or three fingers, endeavor to force that hip which is nearest the front towards the symphysis, and, if we succeed in effecting its delivery in that position, we should, with a proper degree of force, continue to turn the forward hip more and more round, so as to bring the child's spine at least as far in front as the ramus of the ischium or pubis; so that, when the shoulders begin to enter, they may enter obliquely, and that, after they have passed down, the head may also enter obliquely, or at least transversely. For example, let the sacrum be towards the mother's back, the child's right hip will be on the right ischium of the mother. We might try to get the right hip towards the ramus of the ischium, then towards the ramus of the pubis, and, as it advances, cause it to emerge just under the arch. When fully emerged, the hip should be turned more and more round to the left of the mother, so as to let the right shoulder enter the brim at the left acetabulum, afterwards to escape under the arch, in doing which the child's face will enter near the left sacro-iliac symphysis, or at least near the left ischial plane, and at last slide into the hollow of the sacrum, as in the second position of the breech.

Where, in consequence of the grasping force of the womb holding the child's body tight during a pain, this desirable rotation cannot be gently effected, we ought to watch for an opportunity, during the absence of a pain, to push the child's body upwards again as far as we conveniently can, and then draw it downwards, endeavoring, while pulling it downwards, to twist or rotate it in the manner that is required, and above recommended.

If, on the other hand, we endeavor to bring the left hip to the pubis, we shall also get the left shoulder there; and at last, compelling the face to enter at the right sacro-iliac symphysis, we shall terminate the labor as in the first position of the breech.

CASE.—I shall here relate a case taken from my record book, which may serve to show the Student what a great rotation may be effected by the hand of the practitioner, in cases of the fourth position.

Tuesday, October 5th, 1830. Mrs. J., a young woman in her first pregnancy, sent for me at eight o'clock P. M. The waters had come off at five o'clock P. M. The os uteri, at my arrival, was almost completely opened. I touched the breech and feet; the toes were towards the left acetabulum. At a quarter before nine o'clock, I disengaged the right foot, and then the left one. At nine, the arms were both delivered, the left one escaping first along the perineum, and the right one under the pubis. I could not effect any further rotation, and was sorry to find the chin immediately behind the symphysis pubis. I then turned the child's body on its axis, and pulling the chin well downwards pressed the face with two fingers, on its right side, and with great ease turned it into the hollow of the sacrum. I next made a channel by passing up two fingers to the superior maxilla, so as to admit air freely to the nose, and the infant breathed; there was a total cessation of pulsation in the cord. The child breathed and cried at least for twenty minutes before the head was extracted, which I could not effect until I carried its body upwards towards the mother's abdomen, and rolled her over on her right side, which gave me far better power to aid her with my right hand. The infant was born living, and did well. Let the Student remark that I turned the woman on her right side at the close of this labor. I wish that, in any case where he encounters delay or difficulty, yet not to such an extent as to demand the forceps, he would, at the last moment, turn his patient upon her right side, so as to enable him to make use of his right hand in assisting to make the head roll out under the crown of the arch. The fingers of the right hand are stronger and more apt than those of the left, and in these cases, where expedition in the operation is so essential to safety, it is desirable to obtain even this not inconsiderable facility and advantage.

CASE.—On Thursday, July 14th, 1836, Mrs. ——— was seized with labor pains, which came on with the rupture of the membranes. At six o'clock, I made an examination, and found the left foot in the vagina, accompanied by the umbilical cord, which pulsated. The toes were directed to the pubis. I could reach the breech of the child, but the right foot was so high up that I could not touch it. In a short time the left foot came quite down; and in order to rotate the body I drew moderately upon the foot, which caused the left hip rapidly to approach the pubis. I could not even yet get at the right foot, wherefore I permitted the child to descend with that limb pressed upwards against the belly; the left hip came under the centre of the arch, and, as soon as I could command it, I turned it more and more round, so that when the arms were delivered I found the face in the sacrum, soon after which the head was expelled. I immediately ascertained that there was a second child; pains came on, and in fifteen minutes after the first one was born, I broke the membranes of the second, which presented the nates and the right foot. The foot prolapsed, but the other limb was pressed against the child's belly, so that I could not get it; the sacrum was to the right acetabulum. When the shoulders were delivered, I found the child's face rather transversely directed towards the left ischium. I brought it into the hollow of the sacrum, soon after which it was also expelled. Both children were well.

It is so easy a matter, in general, to cause the body to rotate during its transit through the pelvis, that it very rarely happens, if the physician is called early, that the face at last is found towards the pubis.

With regard to the presentations of the feet and knees, I do not feel that it is necessary for me to enlarge upon them before I close this chapter, inasmuch as the footling case is a mere accident happening in a pelvic presentation, and which, moreover, can never prevent it from being at last a pelvic presentation—for all footling and knee cases are certainly breech presentations. I may remark, however, that the knee presentation is found to be embarrassing from the tendency there is to a sort of arrest, in consequence of the knees abutting against the sides or parietes of the pelvis, which is sufficient to prevent the descent of the child's nates, so that they, being thereby thrust over to the opposite side, cannot enter the excavation. Hence, where the knees present, it is advisable to convert it into a footling case, which can be done by pushing the whole presentation upwards, during the absence of pain, in order to gain space enough to bring down the feet.

The Student will perceive, if he refers to the axis of the womb and that of the vagina, that in a knee case, in which the child's back is towards the left front of the mother, the thighs would be very greatly extended, or bent backwards, before they could emerge from the external organs; an extension that must be very difficult to effect where the legs are bent up on the back of the thighs—for in such circumstances the rectus femoris, and indeed the whole quadriceps muscle must be put excessively on the stretch. It is a good rule, therefore, in knee presentations, to get the feet down as soon as it can be prudently done; whereas, in the well-defined breech cases, the feet ought not to be brought down, except for some valid and well-understood cause.

In order to distinguish the feet from the hands, for which they are sometimes mistaken, it is only necessary to give attention to the sensations imparted by the operation of Touching. The even range of the ends of the toes, and their shortness, compared with the length of the fingers; the closeness of the great toe to the one next to it, in contrast with the wide separation of the thumb from the forefinger; the ankle and the heel are marks that might be supposed sufficiently prominent to guard us against even the danger of mistake; yet very great attention is in some instances required to enable us to aver positively that the presenting part is, or is not, the foot.

As the footling is but a deviation from the breech presentation, its positions are like its original form—namely, the heels to the left acetabulum; the heels to the right acetabulum; the heels to the pubis; and lastly the heels to the sacrum. As the treatment is precisely the same as in presentations of the nates, I shall not detain the reader by any further remarks upon the management of them.

CHAPTER XIII.

OF PRETERNATURAL LABOR.

ANY labor that cannot be brought to a safe conclusion by the natural powers of the system might properly be denominated a preternatural labor; and, as the causes that might prevent the accomplishment of the parturition, save by the intervention of our art, are very numerous, it follows that there are a great many kinds of preternatural labor.

Causes.—A labor may be accidentally changed from a natural to a preternatural one; or it may possess a preternatural character from the very beginning, and be unavoidably so. Thus, a woman may have brought her child almost into the world without any appearance of disorder, or danger, or uncommon distress, and be then suddenly attacked with convulsions, apoplexy, hemorrhage or laceration of the womb, &c. &c., either of which occurrences completely changes the character of the labor. Or she may, in consequence of disease or accident, be found incapable of bringing her child into the light without surgical aid; as, where the passages are closed by stricture, or by some fibrous tumor, or by a deformity of the bones of the pelvis. Lastly, the labor may be preternatural because there presents at the strait some portion of the child which cannot pass through it, but must be put aside in order to let some other part advance, before the labor can be brought to a close. For example, if the arm or shoulder should present, it is necessary to put them out of the way and bring the head back to the opening, or else the feet must be brought there, the child being for that purpose turned quite over; for have we not learned that one or the other of the extremities of the fœtal ovoid must advance, in order to admit of the escape of the child?

It appears from the above that the causes which constitute preternatural labor are very various; and it is reasonable to infer that the medical and obstetric treatment of the several cases will be founded upon the peculiar and distinguishing character of each individual example of the labors. The subject, therefore, embraces so wide a field of discussion and detail, that it will be requisite to treat it according to the nature of the several causes that happen to interfere with the usual process of child-birth; whence I shall endeavor to describe the different sorts of preternatural labor according to the circumstances that make them what they are, and point out the modes of treatment most suitable to their several natures.

Perhaps it matters not which kind of preternatural labor is here first treated of, for there is no natural order or method of their occurrence; each one might be the subject of a separate monograph. Yet I have chosen to commence with the account of presentations of the shoulder, in which the operation of Turning is generally considered to be inevitable as a part of the treatment; and since that operation is not unfrequently resorted to in other specimens of preternatural labor, I deem it of some advantage to take an early opportunity of describing it in this connection.

I have already said that, in order to constitute a natural labor, one of the extremities of the fœtal ovoid ought to present at the opening; and I have treated of the pelvic presentations as being natural; and I have supposed that the knee and footling cases are but accidents or deviations of the natural pelvic presentation.

In presentations of the head, there is also, I said, a liability to deviations, by which the head glances off from the brim of the pelvis, whereupon it is either turned upwards into the venter of the ilium, or rises above the top of the pubis.

In a case where the direction of the uterus is very oblique, so as to allow the fundus to fall far down into the right flank of the patient, the child, if pressed by the contractions of the fundus, might be pushed towards the left side of the brim of the pelvis in such a manner as to make it doubtful whether the head would enter the strait, or slide upwards on the left side of the womb. For the most part, it fortunately happens, even in the very greatest lateral obliquity of the womb, that the head is not deflected, but enters the strait; but in a few examples it is found to rise upwards, instead of engaging. When this takes place, it must almost inevitably happen for the shoulder to fall into the cavity from which the head was turned away, and as the shoulder is a projecting part, it is very liable to maintain the position in which it is once ensconced. The shoulder, therefore, when the head glances off, descends or engages in the superior strait, and is pushed downwards by the uterine contractions as far as it can possibly be urged, and then it stops. The strait being now jammed full of a mass, composed of the shoulder, arm, neck, throat, and part of the thorax of the child; and when no additional portions of the child can be pressed into it, a total arrest of the progress takes place, and the woman, after vain struggles, protracted according to the strength of her constitution, sinks at last, without the possibility of rescue from death except by the skilful aid of the obstetrician, or by the happy event of what is called a spontaneous evolution.

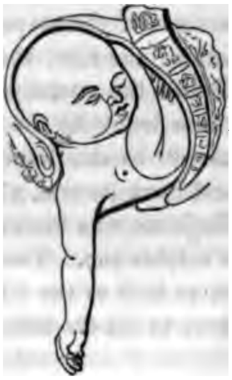
There can scarcely be any need for me to enlarge upon the impracticability of delivery here except by art; for even could the shoulder be pushed down as low as the vulva, it would happen, at last, that the head would be again brought to the strait from which it had been turned off, but it would be accompanied by the child's body, either of which, alone, is sufficient to fill the plane and the excavation, so that the two together could by no means pass through. The remedy is either to push the shoulder out of the way, and to bring the child's feet down so as to deliver it footling, or to restore the head to its proper place. There is, even where the operation is impracticable, an exceptional escape from death under these circumstances by the very rare occurrence of what is called spontaneous evolution of the fœtus, to be hereafter described.

I ought to remark that while the shoulder presentation is a deviation or accident occurring in an original head presentation, so it may happen that, instead of the shoulder, the hand or elbow may come down; but in fact they are mere circumstances of a shoulder case; and when they are advanced to a certain degree, it is the shoulder, after all, that fills the strait and the excavation, and which constitutes the presentation. The hand and arm are merely prolapsed, and their prolapsion adds nothing to the difficulty of the case; indeed, their prolapsion serves as a means of guiding us in our diagnosis, and does not at all oppose the successful treatment of the labor. In the management of a pelvic presentation, I should, in general, prefer that the feet should not prolapse; in a shoulder presentation, it would be rather a favorable circumstance for the arm to prolapse.

CASE.—Some months since I was in attendance in a labor case, in which, though the os uteri was very much dilated, and completely dilatable and distended with the bag of waters, I could not with the index finger touch the presentation. The patient was very much flexed, which relaxed her abdominal integuments. Upon placing my hand over the right iliacus muscle, I distinctly felt the orbicular mass of the child's head under my palm. Introducing the fingers again, I waited until a pain came on. As soon as the bag of waters became tense from the pain, I pressed, with my left hand, the head out of the right iliac fossa towards the chasm of the superior strait. I then ruptured the ovum, and exhorting the woman to "bear down, bear down," I had the pleasure to perceive the head driven quite into the excavation, and to find it born after a few minutes. Doubtless, I prevented the shoulder from coming to the os uteri by pushing the head to it.

Two Shoulder Presentations.—Two Positions for each Shoulder.—As there are two shoulders, a right and a left one, there must be a set of positions for each shoulder; but in determining what is the position of the shoulder, it is also necessary to determine the situation of the child's head. In speaking of natural labor with the vertex in the first position, I endeavored to explain the causes which give a greater number of first positions. The same reasons operate to produce, in shoulder presentations, a greater proportion of instances in which the head is to the left side of the pelvis, than those in which it is to the right side. Now if the right shoulder presents at the strait and the head is to the left, as in Fig. 92, the face of the child and its toes and feet will look towards the mother's back; but if the same shoulder presents, and the head is to the right side of the pelvis, the face and front of the child must look towards the mother's front: so of the left shoulder in the first position, the face will look in front, and in the second position it will look towards the mother's back. By speaking, therefore, of the positions of the two shoulders separately, we get a better and less complex idea of this sort of labor than we should have were we to enumerate a set of positions without such a division.

Fig. 92.



I think that the form of the fœtus and the capacity of the womb are such as to make it unnecessary to establish more than two positions for each shoulder: for example, for the right shoulder a first position, or that in which the head is to the left, looking backwards, and a second in which the head is to the right, and looking front; for the left shoulder, a first position, wherein the head is to the left, looking front, and a second in which it is to the right, looking towards the back of the mother. This will, I think, be quite sufficient; and gives us four positions for the shoulders, hand, or elbow. It is not to be denied that the head might be in front, looking to the left, or looking to the right side of the mother, giving us in the former case a right shoulder, and in the latter a left one, in the strait; but it is needless to enumerate such a position, as the contractions of the womb and abdominal muscles would soon turn it into one of the attitudes I have before pointed out.

Diagnosis.—The signs by which a shoulder at the strait may be diagnosed are, 1. The want of the regular form of the bag of waters, which in all preternatural presentations is without that proper convex shape that we notice in favorable instances of natural labor: when the membranes pass down into the vagina, shaped almost like an intestine, or of a cylindrical form, there is good reason to think there is something untoward in the posture of the infant. 2. The spinous process of the scapula; the clavicle; the round-shaped shoulder; the axilla; the ribs; the arm, distinguishable by its size from the thigh. Should the attendant retain any doubts, let him never omit to remove those doubts by the introduction of half his hand into the vagina, where he will be able freely to examine the nature of the presenting part, and learn its true position. No person is excusable for mistaking the diagnosis who knows he can command so infallible a method of making a correct one. The diagnosis can always be made in good time—that is, as soon as the dilatation will admit; and until then nothing can be done to aid the labor.

Turning.—Having ascertained that a shoulder is at the strait, there remains but one determination for the practitioner, and that is to put it away and bring another part of the child to present. This necessity, and the hazard in which, consequently, both the mother and child are involved, should be plainly and seriously laid before those who have the best right to know her case; namely, her husband or parents, or such near relatives or friends as may seem to be, for the time, in *loco parentis* for her. The necessity for interference ought also to be explained to the sufferer herself, but in the gentlest and most cheering manner possible. If it be within the bounds of possibility to do so in good time, a medical brother ought to be invited, in order that his counsel may be taken, and particularly that the friends, and the patient also, may have no doubt left in their minds as to the propriety of the operation, nor claim the least right to find fault afterwards with the physician, should any untoward event follow the plan he had recommended. The act of turning to deliver by the feet is fraught with danger, for there is danger of uterine laceration, or of fatal contusions of the parts of the mother, and of failure to succeed in effecting the version, and great danger of destroying the life of the child in the act of turning. In early times, our ancestors, who did not understand the mechanism of labor, used to wait, after pushing the shoulder back into the body, in hopes the head might descend. For example, here is the doctrine of Thomas Rainold, to be found at fol. lxv. of his "Woman's Booke:" "And yf so be that it appears and comes forth first the shoulders, as in the XI figure, then muste ye fayre and softlye thruste it backe again by the shoulders till suche tyme as the head come forwarde." It may be that those old practitioners of the days of Queen Elizabeth may have sometimes succeeded, by pushing up the presenting shoulder, in getting the head at last to come to the strait again; but such an event appears to me in any case most improbable.

But no operation can be performed while the os uteri is so closed as to refuse admittance to the hand. It cannot and must not be forced. The mouth of the womb must be dilated or dilatable before any operation is lawful; it must be dilated or sufficiently yielding to allow the hand to pass upwards into the uterine cavity; of this degree of dilatability the obstetrician is the only judge. He must never run the risk of tearing or inflaming such an important organ, since its laceration by his hand would be much increased by the following birth of the child, and place the woman in danger of sudden death; or he might contuse the parts so much as to establish a very dangerous inflammation in them. So important is it to judge aright concerning the *time* to be chosen for the exploration of the womb, that it is thought to be the most responsible duty of the physician in the whole case. If he proceed too soon, the most lamentable consequences are apt to ensue; and if he defer the procedure too long, the difficulties and dangers are greatly enhanced by the delay, while the patient also suffers useless and pernicious pain. The bladder and rectum should be evacuated before the operation. The position should be carefully ascertained; this can be done by the introduction of the hand, if necessary, into the vagina; and if it be certain that the left shoulder presents with the head on the left side of the womb, then he must make choice of that hand which can most conveniently be employed in the operation. The rule is to use that hand whose palm, when open in the cavity of the womb, would look towards the face or breast or belly of the child, which, in this instance, would be the right hand; for it is clear that if the left hand were used, it would not apply the palm to the front of the infant, whether it were carried up before or behind the child's body.

Although some accoucheurs prefer the lateral decubitus, the best position for the patient is that on the back, with the end of the sacrum brought quite over the edge of the bed, the feet and knees being properly supported by assistants, one holding each limb, which should be properly flexed. The woman ought to be carefully covered with a sheet or a light blanket, according to the season of the year, and some thick clothes should be placed on the floor, under the foot of the bed, to receive any discharges of water or blood that might accompany the operation.

Everything being fully prepared, the operator's right arm should be bared to the elbow, and well anointed with lard, while a sufficient quantity of the same material should be applied to the external parts. During a pain, two fingers, and then three, should be passed into the vagina, to be followed by the little finger, and afterwards by the thumb, strongly flexed into the palm. The hand, having gained possession of the vagina, may then rest until the pain is gone off, after which the presenting part must be pushed upwards and leftwards, the fingers and whole hand following the receding shoulder into the cavity of the womb. The shoulder being moved somewhat to the left as it mounts upwards, when the hand is fairly introduced, it ought to be opened and glided along the breast or abdomen towards the feet or knees of the fœtus, which will be looked for towards the right superior posterior portion of the cavity. In searching for the feet, the contractions of the womb are excited, and pains are produced, especially if the waters are much drained off. During these contractions, it is absolutely necessary to open the hand, lest the uterus, from the violence of its own action, might be torn on the knuckles; and the hand ought never to move except the organ be in a state of relaxation. At length, after more or less research, one or both feet, or a knee is found; and, whether it be one or the other, it should be taken hold of; for it is nearly a matter of indifference whether it be one foot or both, or one knee that is used as the point on which to act in turning the child. Dr. Collins, p. 69, remarks, on this point, that "it is quite sufficient to bring down one foot," and I find that Dr. Simpson of Edinburgh is of the same opinion—deeming it far more injurious to make perverse attempts at exploration, than to deliver by one foot only. I say nearly a matter of indifference, because, the object being to turn the child as soon as practicable, with proper caution it may be effected in either of these ways: it is always desirable to get the hand out of the uterus as soon as may be, and it is far better to turn by one foot or by a knee, than to incur the risk of laceration or contusions of the organ, by a tedious search after the other foot, which, if it be not originally near its fellow, is very hard to be found by any search for it. The inexperienced student can have little notion of the extreme difficulty there is to move the hand about while it is compressed betwixt the womb and the child; a short experiment of this difficulty would suffice to convince him of the propriety of the foregoing directions. If he should use the knee as a point of traction, it would be very easy, when the version is nearly complete, to draw the foot down. If he use only one foot to turn by, he will have nearly all the proposed advantage of the breech presentation combined with the greater facility enjoyed in manipulating in the footling case—that is to say, he will have the abundant dilatation, and the power of traction by the limb. It sometimes happens that a foot is met with close to the orifice; so that, even without carrying the hand within the uterus, the foot can be hooked down by means of one or two fingers, as has been done by Dr. Robert Lee, of London.

Having found the foot, if a pain should come on immediately, and become severe, the foot should be let go, and caught again after the pain is gone off, according to the discretion of the operator. During all the time he is passing his hand up and exploring for the child, either his own unoccupied hand or that of an assistant should be applied to the abdomen, in order, by pressing the womb downwards, to keep the os uteri within the strait; and when he is ready to turn the child, his own hand only should be used by the operator to press on the outside of the abdomen, so as to favor the version by pushing the breech of the child downwards, while he also draws it downwards by the feet or knees. If the hand ought not to move during a pain, it would, *à fortiori*, be the height of rashness to attempt to turn the child with the womb in a state of contraction. The time for turning ought to be chosen as soon as the pain has gone off. Then the womb feels yielding and soft as a wet bladder, and the part held in the hand may be drawn towards the os uteri slowly and gently, but firmly, and, if possible, brought quite into the vagina, or even to the vulva. External pressure with the free hand favors this version very considerably, and ought never to be neglected.

It is easy to ascertain if the version be complete by external taxis, and by noticing how far the child is drawn downwards, and judging of its length as compared with the length of the uterus, as well as by noting the effect of the next pain, which propels it if it be turned, but does not move it if it be still transversely fixed in utero.

The Student should remember that the child, from the extremity of the buttock to the crown of the head, is between eleven and twelve inches in length. Hence his hand placed on the abdomen will inform him whether the uterus is of this length or not. If he find the buttock at the os uteri, and the uterus not so long as it should be under the circumstances, he will know that the version is not yet completed, and take his measures accordingly.

Wherever it is possible to make choice of a foot to pull on, we should select that which is nearest the front of the pelvis. In the present case, it would be the right foot, because, in drawing upon that one, the right hip would come under the pubic arch, and favor very decidedly our wish to bring the vertex at last to the pubis, and carry the face to the hollow of the sacrum; whereas, should we draw down upon the left foot, the child's face would, at last, be very sure to come to the pubis.

Under all circumstances, the practitioner is only called upon to do that which he can do, and not that which he would but cannot do; therefore, when he can only find the most unfavorable foot, let him draw by it and meet the consequences.

As soon as the turning is complete, the case has become a footling one, and must be treated as if it were originally so; that is, it should be left to the expulsive powers alone, if they are sufficient, for it is always bad and almost always unnecessary to draw out the body; it should be expelled by the pains. The arms must receive such assistance as they may need; and the head, being properly situated in the vagina, ought to be expelled by the womb with such aid, from slight tractions, as the obstetrician may adventure with safety to make.

In going about to perform this operation, the medical attendant ought to reflect upon all the dangers incident to it, and clearly understand, beforehand, that what is most desired in it is, not speed, but safety; *festina lente* ought to be the motto. As to the difficulties of it, they are so great, in a womb long drained of its waters and lashed into fury by a long period of unavailing irritation suffered previously to the operation, that nothing but practical experience of them can make them known, unless indeed the fact be understood that it cannot in some instances be effected at all, and that we are obliged to extract the child double, after having removed the thoracic viscera, as well as those of the abdomen, by the crotchet and perforator; upon doing which, the fœtal remains may be drawn forth.

I have, after having had my hand in the womb, found it so completely benumbed by the pressure, as to be unable to feel with it or to close it;

in such a case, the other ought to be made use of, however ill adapted either for the exploration or seizing the feet, &c.

The child being delivered, the mother must be drawn up into her bed, so as to enable her to stretch out her feet, and as soon as the placenta is taken away, she should be bandaged and put to bed properly. A grain of opium, or a dose of laudanum consisting of twenty or forty drops, is very soothing and calming, after such high excitement and fatigue, and ought not to be withheld from her. A cup of tea or gruel may next be presented to her, and a short sleep, if she can take it, is followed by a comfortable state, for the before exhausted woman.

There is very little difficulty in this operation, if the waters are not gone off; they should, therefore, be always left whole, if possible, until the moment for the interference is at hand. Could we, indeed, always have the privilege of rupturing the ovum at the time of carrying the hand into the womb, we should avoid much difficulty, and a large moiety of the danger of doing mischief. Unfortunately, however, turning is rarely determined on until the waters are lost, and then the danger is necessarily greater.

There are many very ignorant persons, who are generally the more presumptuous the more they lack knowledge, into whose hands women are so unhappy as to fall on the occasion of their child-birth. If, in a shoulder presentation, the hand happens to prolapse, they, finding a very convenient handle, make use of it to pull the child away by; and I have seen a case in which an unfortunate woman had been so treated: the arm was wholly withdrawn, and the acromion process of the scapula was actually under the pubic arch—so violent were the tractions that had been made on the hand and arm. This was done too with a rigid os uteri, which, after yielding a reluctant passage for the arm and point of the shoulder, was now grasping the parts above it with a strength like that of a rope, and which afterwards resisted, for a long time, all attempts to pass the hand along betwixt its circle and the child. To one unaccustomed to the incidents of the lying-in chamber, it would be, perhaps, vain to attempt to convey an idea of the resistance sometimes met with in the circle of the os uteri. Dr. Collins, in speaking of one of his cases in the Dublin Hospital, says, at p. 67, "The mouth of the womb was absolutely as firm as a piece of thick leather, and embraced the arm of the child as tightly as a ligature could be applied without cutting the part."

There cannot happen anything but evil from pulling at the hand and arm. Such force cannot pull down the child, which is too large to pass doubled. The arm, actually, is not in the way; for the hand of a practitioner and the arm of a fœtus at term can never equal in size a circle sufficiently large for the head to pass through it. The lack of space is not in the faulty construction of the pelvis, but in the rigid constriction of the os uteri and vagina, which, if too rigid to admit the hand, is also too much so to allow the child to escape. That rigidity can be overcome. It cannot be needful to excise the arm, or twist it off at the shoulder-joint, a horrid practice, which seems to have received a salutary check from a judicial investigation that was had a few years since in France: a practitioner there, finding it impossible for *him* to deliver in an arm presentation, cut it off at the shoulder joint, and nevertheless the child was born alive. The obstetrician was justly prosecuted on a charge for maiming.

If the os uteri will not admit the hand of the accoucheur, it is because it is not dilated or dilatable. Let the proper measures, then, for effecting the requisite change in the uterine tension be resorted to. These are bleeding; the warm bath; antimonials; emollient enemata, followed by enemata of laudanum; and patience, though last, is not the least of the resources for such an occasion. Women in labor bear venesection remarkably well; and they demand, in some instances, very plentiful bleeding in order to get the full benefit of that remedy. A patient bled ad deliquium animi will be more capable of undergoing safely the operation of turning, than one left to the unmitigated provocations and stimulus of useless labor pains.

It will have been seen that, in a preceding page, I have strongly expressed my dissent as to the anæsthetic practice in Midwifery. If there could be a case to render a complete anæsthesia by ether or chloroform a desirable condition for the patient and the practitioner, this is the case *par excellence;* certainly a complete anæsthesia might have the effect to abolish the voluntary power of the mother, and, thus taking away the injurious force of the abdominal muscles and diaphragm, leave her to the sole influences of the uterine powers, which are not wholly annulled even by the deepest anæsthetic insensibility. Professor Simpson and other distinguished gentlemen warmly advocate the induction of anæsthesia in these cases; let the Student give heed to the opinions of these meritorious men, but let him be the sole judge of his own duty in any and in every case.

The warm bath is a safe and easy remedy for the obstinate constriction of the orifice, as it is for all spasms and other congenerous disorders. Tartar emetic, in doses of the eighth or sixteenth part of a grain, repeated every thirty or forty minutes, conduces very powerfully to the reduction of the spasm or rigidity, and it may be very safely resorted to in the management of our case. Much reliance is also to be placed on the power of the belladonna ointment applied to the cervix uteri, in which it often most speedily induces a complete local anæsthesia. Copious enemata of infusion of flaxseed, with a portion of castor oil to render it somewhat more aperient, should be had recourse to, and they may be followed by anodyne enemata, composed of an ounce of flaxseed tea or starch, with from fifty to eighty or one hundred drops of laudanum. We should also not forget that patience ought to work her perfect work, and no more; the accoucheur must be the sole judge of how far patience ought to go.

I should think that there can never be the least use in attempting to return the arm. The arm must be withdrawn by the version of the child: it goes upwards into the womb as the head rises and the breech descends. It would always be prudent to secure it by a noose, for the purpose of preventing its going too high within the cavity, where its presence might cause some embarrassment in the delivery of the head.

P. Cosgreave, Esq., in the *Lancet* of 1828–9, p. 298, informs us, however, that he has never lost a child in an arm presentation. His method is to push up the arm during the absence of the pain, and return it into the womb and hold it there; after which the spontaneous evolution takes place, and the infant is born by the spontaneous powers of the womb. Mr. C. must certainly be regarded as a very lucky practitioner, to have met only with cases in which he could restore the arm to the cavity in this way, or in other words turn the child without searching for the feet. I am not aware of the number of his cases. I cannot, therefore, judge of the comparative success.

Some persons have imagined that in the conduct of some of these dreadful cases of shoulder presentation, great facility in delivering the woman is obtained by amputating the arm, or wrenching or twisting it off by sheer brute force. Indeed, I am aware of an instance in which the doctor tore off in utero the arm of a child which was afterwards born alive, with the end of the humerus projecting below the ragged and torn edges of the wound. The arm was hidden, but afterwards discovered. The people interested, were made to believe that the lost arm had been destroyed by absorption.

Such a course of proceeding is to the last degree unjustifiable. Unjustifiable before the outraged family, and equally so as bringing unmerited discredit upon the whole profession of physic. If in any case it were deemed necessary to remove the prolapsed arm, it ought not to be done without any antecedent announcement of the purpose, and its motives. For my own part, I cannot understand what are the motives that should lead an accoucheur to do so barbarous an act.

The extirpation cannot be deemed needful to provide space within a pelvis, since the arm of a fœtus can never fill up a pelvis so as to prevent the introduction of the accoucheur's hand for exploration and version. Whenever it is done, it is done with a view to make space within soft parts, but those soft parts will dilate in due time and under wise treatment. My clear opinion is that the amputation of the arm in shoulder presentations is a mala-praxis, and that it ought to be discountenanced and protested against.

Spontaneous Evolution of the Fœtus.—It has happened that the operator, being unable to turn the child, has abandoned any further and useless attempts to deliver. In such instances, the woman has sometimes delivered herself by what is called spontaneous evolution of the fœtus.

It is very important for the Student to understand clearly what is meant by spontaneous evolution of the child; and it will not be difficult for him to do so, if he will bear in mind the facts: 1st, that there is a superior strait; and, 2d, that the child's head and its body cannot be within the plane of that strait at the same time.

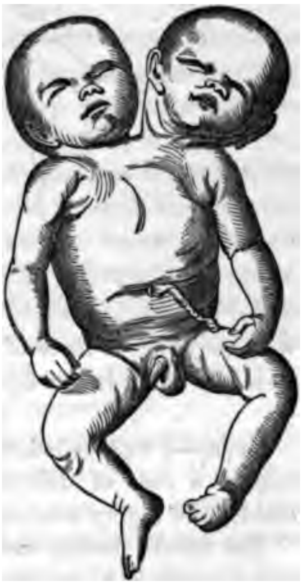
Now when the shoulder is presenting, and the arm, fallen down, allows the shoulder to be thrust or drawn quite out underneath the triangular ligament of the pubis, it happens that the side of the child's neck lies against the inner aspect of the symphysis of the pubis. But, if the side of the neck is pressed against the wall of the symphysis, the head of the child will lie upon, and even project over and beyond the horizontal part of the pubal bone, making a hard orbicular tumor that may be felt there with the hand, laid on the hypogaster.

Now, things being situated as above, let the Student conceive that the trunk of the child's body, still contained in the womb, is thrust by the continued contractions more and more downwards, the head still resting upon or beyond the brim. The effect of this downward thrusting force will be to push the shoulder farther and farther out beyond the crown of the arch, and the head more and more over the top of the bone, leaving a space in which to thrust the trunk of the child. If it be a left shoulder case in the second position, the third rib will come out at the vulva, then the fourth, fifth, sixth, seventh, and so on until all the left side of the thorax is pushed out; after which follow the left flank, the left ischium, and trochanter; upon the escape of which the left thigh and leg are delivered, followed immediately by the right thigh and leg, then the right arm, whereupon nothing remains but the head, which is speedily born.

Such is a spontaneous evolution. It differs from Version or Turning in this—that in turning the head goes up to the fundus, while the buttock comes into the passage. Here the head is held close to the plane of the strait, by the shoulder which has got under the arch, and even projects beyond it, so that the head is, as it were, tied fast to the brim so that it cannot rise.

Here I repeat the figure of the double-headed fœtus, which I already have given at page 220, Fig. 67. Let the Student see in this figure a case in which evolution was indispensable. For example, suppose the right head to have presented, and to be delivered. That head would be held close to the vulva, outside, by the left head and body—the left head and body could not possibly be in the plane of the strait at the same time. It would be impossible to deliver by Turning—for the delivered head ties the undelivered one to the plane of the superior strait. Of course, then, it only remains that the undelivered head shall be forced over the horizontal ramus of the pubis to allow the trunk to descend by evolution, as I have described that process in the shoulder case. As soon as the trunk is born, the remaining head may be brought away.

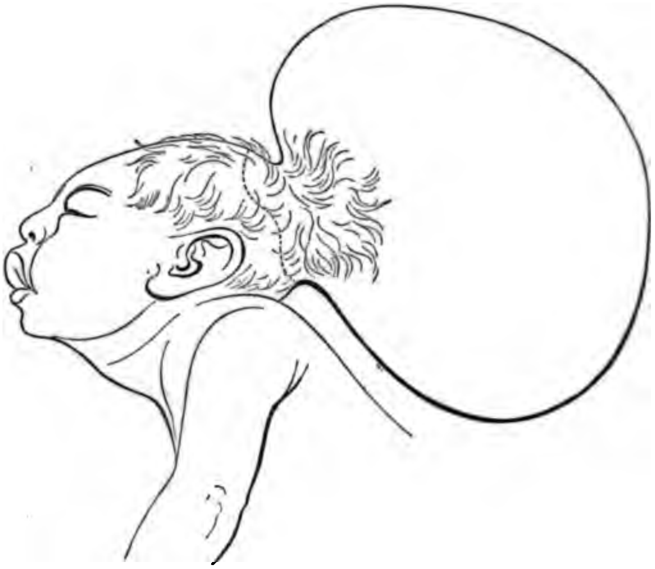
Fig. 93.



Dr. Pfeiffer, who showed me the specimen, delivered the woman, as I found upon inquiry, by compelling the evolution of the body of the fœtus.

Here is a repetition of the figure of Dr. Rohrer's case, given at p. 220. Let the Student observe that such a vast fluctuating tumor on the vertex of the child could never be the really presenting part; that it must necessarily deviate, and go up in the iliac fossa, allowing the true head to present, and making that, of course, a face presentation. I say, of course, for the head would be of course in extension. Well —the labor going on—the head is born in face presentation—giving the face the appearance of suggillation—of which I have made a good representation in the figure; but the head being born, the tumor, larger than the head, remains above the strait, in the same way as the second head of the double-headed fœtus of Dr. Pfeiffer's did. Here, then, is a case in which evolution is indispensable, and Dr. Rohrer informed me that this was what he brought about—after doing which he was enabled, with very violent force of traction, to pull away the caput succedaneum—as you see it in the figure.

Fig. 94.



CASE.—I was called, some time since, by a friend of mine to assist him in a case of difficult and alarming labor. The woman, small, feeble, and highly nervous, was the mother of several children.

The doctor, finding the labor very slow, had administered a dose of ergot, which had brought on a most violent ergotism; to that degree, indeed, that I had great reason to fear she might speedily die from the mere excess of pain and irritation, if not from laceration of the womb, which appeared to me imminent. I have rarely witnessed a wilder expression of agony than hers.

I found the left shoulder down, in the second position. The indication was to turn and deliver by the feet—which I was requested to attempt. Protesting beforehand that I deemed success impossible, I reluctantly consented to make an attempt. With great difficulty, I passed my right hand through the os uteri; but it was completely pinioned and held fast and immovable by the muscular contraction, and I was but too happy to extract it without having caused a laceration of the cervix. The waters had long gone off. The child was dead. I concluded it was impossible to turn, and I felt equally convinced that she would die before evolution could take place spontaneously.

I opened the thorax at the axilla, and broke up the tissues within both pleural cavities. Then, by means of the crotchet, I drew down rib after rib, the flank, the hip, and the buttock, so that I got the left thigh and leg down; then the other extremity, which completed the evolution. The arms came down, and I delivered the head. The woman recovered happily.

I relate the case, in order that the Student, reading it, may have a clearer idea of what is meant by evolution in contradistinction to turning of the child.

Hemorrhagic Labor.—Labors are also rendered preternatural by the occurrence of hemorrhage from the womb; for, although it is very common, and not unfavorable for the parturient woman to have an issue of blood during some part of the process of child-birth, it is not either safe or natural for her to lose so much blood as to give to the flow the character or title of hemorrhagic. In general, the quantity lost antecedently to the birth of the child does not exceed an ounce, and it is commonly even less than that. The occurrence, therefore, of a show of blood need not, and does not excite any alarm or even surprise, unless it goes beyond the ordinary amount. But where the effusion becomes excessive, great alarm is felt, and there is more or less real danger according to the cause of the hemorrhage.

I have already expressed my opinion of the mode of connection between the placenta and the womb; and the Student will have seen that I do not admit that any very large vessels pass from each to the other, interchangeably. Hence, when blood escapes from the uterus, it may be, perhaps, in consequence of a hemorrhagic nisus or sanguine determination, like that which sometimes causes the effusion of blood from the Schneiderian membrane, in those cases of epistaxis that come on spontaneously, or in the floodings in ordinary pure menorrhagia. We often see very copious outpourings of blood in epistaxis, where we can have no reason to suspect any rupture of vessels or solution of continuity in the membrane. The same thing takes place in the pulmonary hemorrhage, and in hæmatemesis. But as the womb, from its very constitution, is prone to the hemorrhagic affection, it is more liable than any of the organs to losses of blood, without the suspicion of rupture of its tissues. Nevertheless, there is reason for believing that, in some cases of profuse bleeding, the delicate tissue of the uterine veins has been ruptured.

The gravid womb, a *vacuum plenum*, is *filled* with the ovum, which is really connected with the containing organ only at the placental superficies. All other points of the ovum, except the placental portion thereof, adhere so slightly as to be most easily capable of detachment. The placenta itself may commonly be separated with great facility from the surface on which it sits. When the chorion is detached from the womb, very little or even no blood escapes; but when the placenta is torn off, the womb generally, not always, bleeds freely. The separation leaves exposed many patulous openings that lead directly into the large veins and sinuses of the uterus. Hence, large effusions of blood, in labor, indicate that the placental surface of the womb is exposed by the separation of the after-birth from it.

If the after-birth is torn off, or in any manner separated from its place, the womb still remaining undiminished in size, it is evident that the blood may continue to flow for an indefinite period, and that the woman may be brought into great danger thereby—for the bleeding orifices may continue to have, for an indefinite term, the same degree of aperture as that which first allowed them to bleed. Supposing the superficial content of the gravid uterus to be two hundred inches, and that of the non-gravid womb to be only three inches, then it is evident that the great desideratum in uterine hemorrhages, before delivery, is to empty the organ as soon as practicable, in order to reduce its superficial content, as nearly as may be, to the smallest number of square inches, or the non-gravid superficies. In treating cases of alarming hemorrhage, therefore, we should ever keep in view the fact that, if the womb be allowed to contract or condense itself, its own muscular fibres will, by their contraction, lessen the calibre of all the blood-vessels that are distributed on or in the organ, and in proportion to this condensation or contraction will be the certainty of arresting the sanguine effusion. It is not the orifice only that is closed, but the whole *tractus* of the vessel that is constringed.

If a labor should commence ever so favorably, with the child presenting the vertex in the first position, and the pains should propel the child downwards, so as to give reason to think the process about to terminate in the most happy manner, it might yet happen that hemorrhage should commence, and continue so abundantly as to make it absolutely necessary to deliver the child, in order to let the womb contract perfectly. This delivery by artificial means converts the labor, which commenced naturally, into a preternatural one. We should hardly be inclined to call that a preternatural labor which, though accompanied with a great effusion of blood, should terminate well, without any assistance on the part of the accoucheur.

There may also be a very copious and dangerous effusion of blood between the time of the birth of the child, and the delivery of the after-birth; and even when the after-birth has been discharged, the flow of blood may be so considerable as to involve the woman in the greatest danger. In the management of all these kinds of bleeding, the same indication is to be kept always in view; to wit, the condensation or contraction of the womb; for when that organ is fully contracted and condensed, the blood cannot flow so abundantly as to endanger the patient, except in some very rare, and almost unheard of cases.

But among the causes of uterine hemorrhage, there is one which has been called the unavoidable cause, which is, perhaps, the most dangerous and difficult to manage: I mean, that case which depends on the situation of the placenta happening to be on the cervix and os uteri. This is essentially a hemorrhagic labor, inasmuch as the conoidal cervix of the womb must not only dilate, but must dilate completely into a cylindrical form, in order to admit of afterwards carrying out the great principle, the final condensation of the womb. Such a hemorrhage begins very moderately, but as larger and larger portions of the placenta continue to be detached with every successive dilating pain, it follows that the nearer the womb is to its complete dilatation, the more profuse and dangerous will be the hemorrhage.

Every considerable effusion of blood in labor does not demand the manual or instrumental assistance of the accoucheur. A woman may shed a quart of blood, and yet the pains may suffice to expel the fœtus in a natural way, after which the flow ceases. It is the effect, or the probable effect, of the bleeding, that renders it needful to interfere. If the pulse begins to grow small and frequent, the patient becoming weaker, the countenance paler, and the pains less energetic, we have to resolve what course we must take, and then resort to some of the numerous expedients for checking the discharge.

If the pulse in uterine hemorrhage be full and throbbing, and the constitution not as yet affected with debility, we may, with great safety and propriety, have recourse to a bleeding from the arm in order to lessen the momentum of the blood, which, by its too great impetuosity, tends to keep up the flow and the determination to the womb—just as we would bleed in a pleurisy or hæmoptoe, with a similar view. Such a course, however, would be very strongly contraindicated in the case of a feeble pulse, and a general state of weakness, faintness, or sinking, where there would be no reasonable ground to hope for relief by the use of venesection.

The application of cold to the hypogastric region is often found to have a good effect in checking the sanguine effusion, and should be freely resorted to by stuping the lower belly with napkins, hard wrung out of cold vinegar and water; the application being renewed from time to time, until we are satisfied that success is, or is not, to crown these efforts. During the employment of the above-mentioned means, the patient ought to be placed in a horizontal posture, with the head very low, and the body covered only with sufficient bed-clothes to keep her comfortable; the apartment should be freely ventilated, and the patient allowed to take any reasonable quantity of iced water, or lemonade, while at the same time she makes use of the infusum rosæ rubræ with elixir of vitriol, or the plumbi acetas with opium.

Such are the general means for repressing the sanguine movement towards the womb; but these means do not suffice always, and we ought to examine by the Touch, in order to make sure, if possible, of the cause of the hemorrhage. If, upon inserting the finger within the os uteri, no portion of the placenta can be felt, and the membranes are found to be unbroken, we may perhaps resolve to rupture the ovum, with a view to diminish the size of the womb by letting its waters run off. If a quart of water should escape from the organ immediately after the breaking of the membranes, the superficies of the womb, and of course the placental superficies, would be sensibly lessened, since the organ contracts as soon as the escape of the waters permits it to do so. This is the method proposed by Louise Bourgeois, a female practitioner in France, many years ago, and it is found to answer perfectly well, in many cases. Louise says, "The bag of waters being as yet not formed, we must break open the membranes that enclose the child, just as we would break open a door to save a house on fire, and draw forth the child by the feet; for this is the way to save the mother's life, and give the child a chance to receive the rite of baptism."—*Obs. Diverses*, &c. &c., 1627, 12°, Paris, p. 65.

There are circumstances, however, that might well induce one to defer to the latest period the breaking of the ovum; such as a known bad presentation of the child, requiring it to be turned. In such a case, no prudent person would be willing, without an absolute necessity, to permit the water to escape from the womb previous to dilatation, since the operation of turning is vastly more difficult, when performed in a female from whom the waters have been quite evacuated, than in one in whom they are still present. Hence, if the mouth of the womb be still very rigid and undilatable, rendering it impossible or improper to introduce the hand for turning, any prudent person would give a very deep consideration to the question, whether the membranes ought to be now broken or not; he would certainly feel inclined to defer, till it should become unavoidable, the rupture of the membranes. Louise goes on to say, "Je n'entend pas que, si tost qu'une femme a une perte de sang, que l'on y procede de cette façon là, mais il faut veiller sur elle comme le chat la souris, et faire la guerre au doigt et à l'œil:" p. 67.

"I do not pretend to say that, as soon as ever a woman is seized with a flooding, we are to proceed after this fashion; but that we must watch her as a cat watches a mouse, and carry on the war with both eye and finger."

If, upon rupturing the ovum, the flow of blood should not be stayed, and the os uteri should still continue to be so rigidly contracted as to make it impossible to turn the child, recourse should be had to the ergot, in very small doses, with a view of producing a feeble ergotism, or tonic contraction of the womb, not severe enough to injure the child, but yet so strong as to condense the uterine tissue sufficiently to arrest the flow of blood from its vessels. With this purpose, five grains of the secale cornutum, in powder, ought to be administered every half hour or every hour, according to the pressing nature of the demand for its aid; or a teaspoonful of the vinous tincture of the same article might be exhibited, at proper intervals, with the same view.

There is, in general, under these circumstances, a strong disposition among practitioners to make use of mechanical means of stopping the hemorrhage, such as the application of napkins to the vulva, strongly compressing the orifice; and also the plug or tampon, which, filling the vagina, is supposed to favor the coagulation of the blood. But, if it be remembered that the bleeding orifices of the placental superficies on the womb are—except in placenta prævia—near the fundus uteri, and that the extravasated fluid trickles down, betwixt the chorion and the womb, from the fundus to the orifice, I think it will be seen that such mechanical means can scarcely exert any other than injurious effects in the case. They may enable us to conceal the fact both from the patient and from ourselves, that the vital fluid is escaping in a dangerous abundance; but common sense ought to show us that, while we may prevent the fluid from falling out of the orifice of the vagina, by plugging that orifice with sponge or other materials, we do not prevent it from flowing back upon the outer surface of the ovum and the placenta, both of which it detaches more and more completely from the womb, leaving the woman exposed to greater hazard than she would incur were we to permit the blood to escape as fast as it is effused. Such methods, assuredly, will not favor the arrest of the effusion by coagulation; the source of the flow being too distant from the compress. It is better, in uterine hemorrhage near term, to let all the blood that escapes from the vessels also escape from the vagina. When the uterine superficies is diminished, the bleeding is stayed. The application of cloths, wrung out of iced vinegar and water, to the hypogastrium, is of greater avail, and far more safe than the tampon. I would gladly urge upon the Student the necessity of the greatest caution in the employment of so dangerous an agent as the tampon, except in the early stages of gestation, or where the capacity of the womb is not sufficiently large to admit of its containing a great quantity of blood. No hemorrhage is so dangerous as the concealed hemorrhage.

Whenever, in a hemorrhagic labor, it is clearly ascertained that the period has arrived for the delivery to be hastened, which is known by the state of the patient's strength, the pulse, the color of her lips and cheeks, and by the dilatation or dilatability of the mouth of the womb, preparation should be made for the operation by placing the woman at the foot of the bed, as in the case before mentioned. The choice of means, whether it is to be of the hand or the forceps, will turn on the degree of advancement of the head, which is readily seized by the forceps, if low in the pelvis, but which is to be pushed away to make room for the search after the feet, provided it be still within or above the brim of the pelvis. In all cases wherein the vertex is to the left side of the antero-posterior diameter of the pelvis, the left hand is to be used; while the right hand is adapted for turning, in all examples of labor where the vertex is to the right half of the pelvis. The operation differs, in no respect, from the one already described, except that the head must be pushed out of the way instead of the shoulder. If the head should have already occupied the upper strait, that strait would be nearly filled with the mass; the hand could not be carried up along-side of it. The palm of the hand, therefore, being placed underneath the head, would push it gently upwards, in the absence of pain, and carrying it to one side, it would be retained on the brim, by the wrist or arm of the physician, which occupies the space recently in possession of the head, while the exploration or search for the feet would be then conducted as in the case already treated.

When I come to speak of the use of the forceps, I shall say what is requisite concerning the indications and manner of its use in the hemorrhagic affections; wherefore, it seems by no means needful for me to anticipate here, what I shall feel obliged to say in a future page of this book.

Placenta Prævia.—The unfortunate location of the placenta on the cervix and os uteri is an accident which does not very frequently happen, and which, when it does occur, can scarcely ever fail to produce much anxiety and alarm among all those who understand the case, and feel any interest whatever in the mother and her offspring. The after-birth may cover the os uteri so exactly, that the very centre of the placenta may correspond to the orifice. The danger is enhanced by as much as the location is more central; that case being the least dangerous in which the edge of the placenta is nearest to the os uteri.

The occurrence will not probably be discovered until about the seventh month, a term of gestation at which the cervical portion of the womb begins more considerably and rapidly to expand, in order to become a part of the general containing cavity for the ovum proper; and it is in some rare instances not discovered, nor even suspected to exist, until the labor at full term comes on. In a majority of cases, however, it happens that as soon as (in the seventh month) the cervix begins to stretch, parts of the placenta are broken off or detached from the surface of the womb, and a flow of blood, more or less violent, ensues, but which stops as soon as the patient lies down, or makes use of a venesection or some cooling drinks. The flow having been concluded, it is thought to have depended upon some strain or shock, &c. &c., and the patient, having recovered, goes about her usual occupations. I have met, however, with examples, in which the first gush of blood was very copious, and I have even seen the very first gush take away the pulses at the wrist and overspread the whole surface with a death-like and most ghastly pallor. It is not difficult to understand that such a sudden and copious exhaustion of the vessels is capable, in a weakly woman, of extinguishing her life in a few minutes. If in such a death-like deliquium the auricle and ventricle should be filled with blood suddenly coagulated within the cavity, life could not be restored.

Happily, however, a first hemorrhage is rarely fatal; the woman recovers from the immediate effects, and supposes it a mere accident requiring no great precautions. In a short time, a further expansion of the cervix detaches a fresh portion, and the exposed womb bleeds again. These attacks of bleeding are renewed again and again, with varied intervals, until, by their violence or the weakness they produce, such an alarm is taken, that an examination per vaginam is proposed, and acceded to, when the cause of so much bleeding is discovered in the fact of the untoward location of the after-birth. It does not invariably happen that the woman bleeds previously to the attack of labor pains, but such occurrence is far too general, not to cause the danger of these frequent repetitions to be kept before our eyes, until the patient is finally delivered. The loss of blood by repeated attacks, during the last two months or six weeks of gestation, renders the subject of them far less capable of bearing the frightful effusion with which she is menaced for the day of her parturition. A woman who should go into labor with a good stock of strength, could bear, without injury, a very copious draught on the sanguine mass, whilst another one, with vessels already drained, should sink from the further exhaustion of a few ounces. I saw, about two years ago, a woman drained nearly to the last drop that could be spared, in a labor that had been preceded by many attacks of bleeding from a placenta prævia.

Hemorrhage arising from the presence of the placenta at the os uteri, called placenta prævia, is also denominated unavoidable hemorrhage. The case should be always suspected to exist when pregnant women are attacked with hemorrhage between the seventh month and Term; and the existence of it should be verified or disproved, in all such cases, by an examination. If it be found to exist, then the friends of the patient, but not the patient herself, ought to be notified of the nature of her position; full instructions ought to be given for the management of any future attacks in the physician's absence; and the services of another medical practitioner should be retained for all sudden emergencies, during the absence of the regular attendant. By such attentions as these, the patient might confidently expect to secure the services of at least one medical man, should her own regular physician happen to be engaged when her time of suffering arrives.

When the placenta is *prævia*, it will be almost certain to produce a bleeding before labor comes on, as I have above intimated; nor is the first flooding, or even the second or third, very apt to usher in the pains or contraction of labor. Such bleeding will be far more likely to occur in a woman who exposes herself to fatigue and various causes of excitement, or to accidents, than in one who keeps herself quiet, carefully avoiding to make any great exertion, or experience any violent emotions of the mind. In all cases of a strong predisposition to bleeding, an increased momentum of the blood augments the predisposition. Hence, cooling diet, gentle aperients, small venesections, and repose, and relaxation of occupation especially, ought to be very carefully prescribed for our patient. The friends should be enjoined to give us the earliest notice of the attack of labor pains, or flooding, or faintness, so that, all preparations being complete, we may have nothing to embarrass us in the exercise of our judgment, during the actual progress of the labor. I should esteem it a sacred obligation resting on the physician, to take precautionary measures in all instances where placenta prævia is ascertained to exist before the onset of labor. To know that a woman is exposed to the greatest danger, and yet to omit warning her friends or herself, would be unpardonable. Women sometimes die in this way very suddenly, and such hazards ought to render us extremely watchful over them. It is true that we have cases of placenta prævia unattended by notable hemorrhage. Indeed, it is easy to understand, that a woman so situated might be rapidly delivered by the spontaneous power of parturition. In such cases, the placenta is rapidly displaced, and suddenly thrust forth before the head of the child. Such a labor, lasting not more than ten minutes, could scarcely prove fatal, or even exhausting, to the woman. Viardel's case, in which he turned and delivered by the feet (*vide* Viardel, p. 87), seems not to have weakened the patient very much.

The degree of hazard of perishing to which the patient is exposed depends on the dilatability of the os uteri, and the strength of the pains to be employed in dilating it: if it be soft, and the pains strong and good, the dilatation may be completed so rapidly as to prevent the effusion of any very great quantity of blood. If, on the contrary, it be rigid, and yield very slowly to the feeble contractions of the fundus, the loss of blood may be very great, and the woman sink before the mouth of the womb becomes prepared for the introduction of the hand. It must be prepared before the hand can be introduced. There is no more important doctrine, in operative midwifery, than that which avers that we must never presume to force the uterus until dilatation or dilatability abstracts from the operation of turning one of its most objectional characters. Dr. Collins, in his late work, speaks so sensibly upon this subject, that I shall not refrain from quoting the following passage from page 93 of his book:—

"I know of no circumstance *so much to be dreaded* as the forcible introduction of the hand where the parts are in a rigid or unyielding state; for, although turning the child is the established and most desirable practice, yet the success of this operation will mainly depend on the judgment of the practitioner in selecting the most proper and favorable time. Cases will happen where he is obliged either to suffer his patient to sink from loss of blood, or proceed to deliver when the parts are in an undilated and rigid state, in order to afford her the only chance of life; but dire necessity should alone compel him to hazard the consequences of such violence." Such is the language of an eminent author, who has witnessed a vast number of labors, and whose ample experience gives him a title to speak as of authority upon this and all other subjects connected with Midwifery.

The time for delivery having arrived, the woman, if sufficiently strong to bear it, should be brought to the edge of the bed, and placed on her back; otherwise, she should not be moved, but attended to as she lies upon the left side. If the head present, and the position be unknown, we ought to infer that the vertex is to the left acetabulum, which is the most common one, and of course commence the operation with the left hand. The palm of the left hand easily applies itself to the face, breast, and abdomen of the child lying in the first vertex position—and of course that is the hand most conveniently applicable to the operation of turning.

In some instances, as when the patient is not very fat, we may detect the position by external exploration, for we may trace the curve of the spine of the child from the buttock to the head with our hands applied to the belly of the parturient patient during the absence of the pains, and the orbicular head is generally to be distinguished through the lower belly by its form and hardness. In April, 1850, I ascertained, in this way, a head presentation with the vertex to the right ischium, and so used the right hand to turn and deliver, which I found to be correct, as I easily caught the child's knee in the left side of the womb.—It is very desirable, in this operation, to use that hand first with which the whole operation is to be effected—and not introduce it and take it away in order to introduce the proper one.—Time and blood are both liable to irreparable loss by such manœuvres. If we happen to select the wrong hand to detach the placenta, and find ourselves under the necessity of withdrawing it and substituting the other, a great many ounces may be wasted in consequence; but it is our duty to save all that it is possible to save. By means of the fingers, we soon learn which side of the uterus is detached from the placenta, and then conduct the fingers in that direction, dilating the womb as we proceed, and carrying the fingers as far upwards as we conveniently can, betwixt the womb and the chorion. The membranes may then be ruptured high up in the uterus, and the feet immediately sought for; the child should be turned as speedily as possible, with proper regard to its safety and that of the mother; and the legs, and even the thighs, should be drawn into the vagina, not only with the view of expediting the delivery, so as to permit the womb to contract, but also in order that the thighs or body of the child being come into the cervix, may, by compressing the bleeding parts there, arrest or impede the flow, and thus save for the patient as many ounces of blood as possible. It is to be remembered that it is the loss of the last half pint of blood that kills the patient. I think that no prudent person would undertake to pierce the placenta, in order to get the hand within the womb. There never can be so much difficulty in detaching, as there would be in piercing the organ; and these two objections lie against perforating it: namely, that the rupture or laceration of its vessels could not but be destructive to the child, which would bleed to death; and also, that if the feet should be dragged through a perforation made in the placenta, the final delivery of the body and head might be very much retarded, by having that mass to pass through, in addition to the other obstacles to the birth; and further, it is evident that, in perforating the placenta and extracting the child through its centre, the organ could scarcely fail to be very completely detached from the womb, while only a partial detachment is required if it be made on one side. It is best, therefore, in all cases, to pass the hand betwixt the placenta and the womb, and not through the placenta.

A strong desire to reinforce the tonic contractility of the womb would induce me, always, to exhibit a portion of the secale cornutum, in these cases, taking care to time the dose so as to secure its operation for a period subsequent to the delivery of the child. The ergot should be in readiness, and given as soon as the turning is completed. If it should operate successfully upon the uterine muscular fibres, it could not but afford additional hope of preserving the patient, at least, from the danger of a good deal of drainage, if not from a more violent and rapid effusion subsequently to the delivery. So confident am I in the power of the ergot administered in this way, that I venture to recommend it very strongly. Many persons, who were constitutionally prone to hemorrhage after delivery, have escaped well, from having taken the spurred rye in the last moments of labor, in order to secure a tonic action of the uterus after delivery of the child.

I need not reiterate my opinion that the operator should never be unprovided with the forceps, with which to extract the head, in case of any uncommon or dangerous delay in its delivery, as I have already stated my opinion that such means of security ought to be provided for every instance of breech labor, or preternatural presentation, of whatever species.

Fortunately for us, we do not have to contend with a great many cases of placenta prævia. I have seen seven cases of these accidents, in which the orifice was completely covered by the after-birth, and several others in which the edge of the placenta was located on the cervical portion of the womb, and occasioned a certain degree of hemorrhage, during the dilatation, but not to any dangerous or very alarming extent.

Dr. Collins mentions that eleven cases occurred during his mastership of the lying-in hospital, equal to one case in one thousand three hundred and ten labors, since he had sixteen thousand four hundred and fourteen labors during his mastership.

It is rather a surprising circumstance that Mauriceau, who was so largely engaged in midwifery practice, and who witnessed a good many cases of placenta prævia, should have been supposed to be ignorant that the original attachment of the after-birth was on the cervix. It has been asserted that this distinguished writer always supposed that, when the placenta was before the child, it was owing to an accidental detachment of it from the fundus, and that it had afterwards fallen down to the orifice, so as to get in advance of the presenting part; and yet, he very distinctly gives directions how to pass the hand, so as in the easiest way to get it by the placenta, when the operation of turning has to be performed; and the twenty-eighth chapter of his second book is devoted to a very full account of the mode of delivery in such cases—and he gives at full length the description of twelve cases of placenta prævia most admirably managed by himself, which are in the first volume. The celebrated Levret gives us, in his article on placental presentations, an elaborate *résumé* of the history of opinions on that accident as expressed by writers antecedent to him. It seems that many practitioners had treated the case, and well too, but without possessing such correct notions upon it as are entertained at the present time.

It will have been perceived that I have not, in this article on placenta prævia, adverted to the new method of treatment which has been so strongly advocated by Drs. Simpson, Radford, and other eminent persons among the brethren in England and in this country. I mean, the total separation of the placenta, by the hand of the accoucheur, as a certain method of putting a stop to the effusion of the blood. The journals and other publications, in which this treatment has been set forth and recommended, contain the relations of numerous cases in which the placenta was either accidentally or designedly separated from its place on the womb, and in which the blood ceased to flow immediately after the complete detachment of the after-birth. Notwithstanding the good success of this practice has begun to render it very popular, I think that too much confidence is reposed in its power to arrest this most dangerous flooding. It has been supposed heretofore that alarming uterine hemorrhages proceed from patulous orifices of vessels of the womb, and that the essential remedy for these effusions consists in the condensation of the uterine texture under the active contractility of its muscular fibres. But the advocates of the new practice in placenta prævia explain their success and urge the adoption of their method upon the new ground that the blood flows, not from the uncovered portion of the uterine placental superficies, but from the uncovered surface of the placenta itself, averring that while a part of the placenta is detached and the rest of it retains its adherence to the uterine surface, the blood of the uterus continues to pass into the cells of the still attached placenta, from whence it escapes into the cells of the detached portion, and thence issues in torrents from its free surface; whence the idea that, by wholly separating the placenta from the womb, no more blood can gain admission to the cells of that tissue, and therefore no more blood can be lost.

Entertaining those views, which I have already at page 200 expressed as to the constitution of the placenta, and its connection with the uterus, and to which I beg the Student to refer, it is clearly impossible for me to admit the truth of the foregoing explanation of the hemorrhage of placenta prævia.

To say that the detachment of the placenta, without any consequent reduction of the superficial contents of the uterus, could arrest a hemorrhage by breaking off the curling arteries (as they are called) of the womb, appears to me quite unphilosophical—for there are thousands of facts of ante-partum and post-partum hemorrhages to prove that the arrest of hemorrhage is the consequence of condensations of the womb under its muscular contraction.

The incision of the womb, in a Cæsarian operation, often cuts through the most vascular part of the organ, and as the bistoury sinks into the tissues, the blood spurts from numerous divided vessels; but, as soon as the child and the secundines are taken out of its cavity, and the organ is allowed to contract, the immense orifices are nullified by the condensation of the texture—a cut of five inches in length being immediately reduced to a length of not more than two or two and a half inches, and its incised edges scarcely allowing of the smallest sanguine exudation.

This I have observed to happen in the instance of Mrs. Raybold, whose case is related in this work. To separate the placenta, and not allow the womb to contract, is to gain nothing; for the hemorrhagic molimen, or the mere traumatic flow, cannot be supposed to cease merely because the curling arteries (so called) are broken off.

Further, in placenta prævia, the effusion is in many instances most dreadful, long before the hand of the accoucheur can be passed upwards, in order to turn and deliver. Nay, it is alarmingly great in some samples, while the os uteri is still not larger than a quarter of a dollar. But, as the placenta is eight inches in diameter, it seems to me not possible to detach the whole viscus with a finger, which is not long enough to reach the very circumference of a centrically implanted after-birth, and, *à fortiori*, not long enough to reach to the remote edge of one not centrically implanted. How shall the accoucheur accomplish the detachment in a rigid and slightly open cervix?

If the os uteri be dilated, or dilatable enough to introduce the hand for turning, the time has arrived for that operation, and there is then assuredly no occasion to detach the placenta. Let the operation be performed at the earliest possible period; for the indication, as in all dangerous uterine hemorrhages, is to let the womb contract, which it cannot effectually do until the ovum is extracted or expelled from its cavity. When that is done, it speedily draws itself to the smallest possible cubic content. Messrs. Simpson, Radford, and the other gentlemen who advocate the new method in placenta prævia, very earnestly recommend the prompt separation of the whole of the placenta; and they are persons whose opinions are justly to be esteemed of the greatest weight; but, notwithstanding the profound respect with which I receive any statement of theirs, I cannot but think that in any case in which it is possible to detach the whole of the placenta, it would be also possible to introduce the whole of the hand, and thus commence at once the operation of turning, which ought to be esteemed as the essential indication of treatment, and which the earlier it is done, so much the greater chance does it give both of rescuing the child and saving the woman from fatal losses of blood.

Heretofore, in turning for a shoulder presentation, I have found the placenta lying at the fundus uteri wholly detached and without any immediate hemorrhage; but I have seen a vast number of most dangerous post-partum hemorrhages occasioned by coagula filling the vagina and acting there as a tampon, allowing the uterus to expand again with influent blood, and rendering the orifices of vessels upon its placental superficies nearly as patulous as before the birth of the child. I cannot suppose, therefore, that, when I have found the placenta wholly detached at the fundus uteri in a labor, hemorrhage failed to occur because of that detachment; nor can I suppose that, in placenta prævia, hemorrhage is arrested because of the artificial detachment; but rather in both cases from association of the hemorrhagic molimen, with the disruption of the utero-placental bond. Let me, before I lay aside this subject, say that, should the Student happen to come in charge of such a labor, and find the woman dangerously exhausted of blood at his arrival, I advise him, when about to deliver, to raise the foot of the bed so as to let the patient lie upon an inclined plane, the head downwards. I once delivered a poor woman in such a case. The foot of the bed was elevated some fifteen or twenty degrees, so that I might say that I lifted the child upwards in delivering it. Probably I saved her from fatal deliquium by this precaution.

Concealed Hemorrhage.—There is another kind of hemorrhage that is met with in parturient women; I mean, the concealed hemorrhage. It may take place from the placental surface, and continue to a dangerous extent, without detaching the circumference of the after-birth from its connection with the womb. In this case, the whole placenta is separated from the womb, with the exception of its rim; and the distensible material admits of so large a quantity of blood being effused betwixt itself and the womb, as to make it take the appearance of a bag filled with blood, and depressed into the uterine cavity. I have never met with a sample of this kind of bleeding; but the phenomena that accompany excessive loss of blood would give intimation to an intelligent physician, in such a case, sufficiently clear to engage him to proceed aright in lessening the bleeding superficies, either by merely discharging the liquor amnii, or by turning, or delivering with the forceps. The symptoms, under such circumstances, would be weakness; dull pain in the womb; suddenly increased size and tension of the organ; frequency and smallness of the pulse; paleness; yawning and sighing; and syncope. The occurrence of such phenomena, in a pregnant woman, if alarmingly great, would, I think, be a full warrant for opening the ovum, or for an expeditious delivery; the latter always, however, to be held in reserve until the womb is dilated or dilatable. Such a case, however, deserves to be profoundly considered before proceeding to the adoption of an extreme measure. The ergotic action might be, with great prospect of advantage, resorted to, in case the hemorrhagic symptoms should not abate upon the discharge of the liquor of the amnios.

Post-Partum Hemorrhage.—The hemorrhages that take place between the delivery of the child and the expulsion of the placenta, are frequently met with, and are so violent as to excite great alarm in the patient herself, or her friends who happen to witness the distressing symptoms that accompany the accident. I think that, in a great majority of labors, the placenta is partially detached by the time the child's head has emerged from the vagina, and that the complete separation frequently takes place still earlier.

In such women as have feeble pains, with long intervals, the effusion of blood is sometimes very great, so that a large quantity frequently is found to be expelled immediately after the child is born, being evidently the result of hemorrhage taking place in the intervals between the pains, yet detained behind or above the presenting part, until the delivery of the child is completed, whereupon it rushes forth with great violence. If this is a correct statement, then it may, *à fortiori*, happen, that the effusion may go on rapidly as soon as the body of the child has escaped. The womb, in many instances, is perfectly passive for some time after the great effort it has made, and the placental superficies being exposed, a torrent of blood issues, which suddenly fills and distends the cavity, and the woman faints and dies without any one perceiving that she has flooded at all. I believe that the blood would always flow out of the vagina, were it not that a firm clot occasionally happens to stop the os uteri, or vagina, like a tampon, so that none can escape; and if the womb be deprived of its irritability, its fibres will offer no resistance to the fluid poured into the cavity, and which, being sealed up by a coagulum at the os uteri and in the vagina, must expand more and more, and with a rapidity that augments as the placental surface grows larger and larger.

A careful practitioner ought not to allow such an event to take place, in his presence. He will frequently place his hand upon the hypogastrium of his patient, and ascertain whether the womb be properly contracted, and enforce its contraction, if necessary, by frictions, and by gently pressing the womb with his fingers applied to the lower part of the abdomen. The irritability of the organ is readily excited into effect by this means; and when the womb becomes properly condensed, there is little danger of any effusion taking place. It should be an invariable custom to place, after the child is born, the hand on the mother's abdomen, to make sure of the contraction of the uterus. This custom will always give prompt information of the existence, or non-existence, of a tonic contraction; and he who fails of attention to this point will, sooner or later, have reason to regret the neglect of so salutary a precaution.

But when flooding comes on, whether after delivery or antecedently to it, the same universal principle of practice is applicable, namely, to empty the cavity as speedily as possible consistently with prudence. Let the placenta be taken away, and, after its removal, let pressure be made on the hypogastrium by the hand, or by a compress and bandage, and the pressure continued until the signs of hemorrhage have completely ceased. After having removed the placenta, or after having turned out from the cavity of the womb a pound of coagula, more or less, the woman cannot be deemed safe until the lapse of an hour or more shall have given assurance that no repetition of the hemorrhage can take place. I have, on a great many different occasions, found myself compelled to turn out the clot again and again, to prevent the patient from falling into fatal syncope. Let the Student, therefore, take heed, that, while he may have saved his patient from fatal hemorrhage at ten o'clock, she fall not into the same hazard again at half-past ten or eleven, or at half-past eleven, being careful not to quit her apartment till he can clearly pronounce her safe. Where the flooding returns again and again, let the Student feel for the pulsating aorta, above the fundus uteri, and pressing the vessel with the ends of his fingers, endeavor so to check or lessen the circulation in that great artery, as to hinder the excess of circulation in the branches below, and so of the uterine arteries. In this way, some lives have been preserved.

It happens that the womb is incapable, sometimes, of separating the placenta wholly from its surface; but if it be half detached, there may flow a great quantity of blood, while the uterus continues unable to expel the after-birth. The duty of the medical attendant here is to separate it entirely, by introducing his hand, and gently detaching it with his fingers, taking every possible care not to leave any portion behind, which, by keeping up a continued irritation, would tend to maintain a hemorrhagic nisus, or even dispose the patient to metritis. He will separate the placenta here, in order to let the uterus contract for the suppression of the hemorrhage, which it will do as soon as it can thrust the secundines forth from its cavity: but let it be always remembered that the hand is not to be introduced unless real need for it exists.

The greatest care should be taken in this case to keep the patient quiet, and strict order should be given not to lift her head from the pillows, until all the appearances of danger are gone. Indeed, she ought to have no pillows. Any attempt to sit up in bed, or even to turn, for a woman excessively reduced by hemorrhage, is dangerous; since any muscular effort, by occasioning faintness or exhaustion, invites a renewal of the hemorrhage and debility, which are both to be deprecated.

Hourglass Contraction.—I have met with several examples of the hourglass contraction of the womb; of which incident, although I have spoken of it at p. 339, I desire to add something in this connection. Hourglass contraction depends either upon the contraction of the womb at the upper limit of its cervical portion, so that the after-birth is contained, as it were, in a separate cell, or the contraction may take place so as merely to include the placenta, still retaining its original connection with the uterus. The finger may pass up to the constricted point, and find the cord closely embraced by it. If no bleeding comes on, it is commonly deemed proper to wait an hour, to see whether the co-ordinate action of the muscular fibres will not overcome the horizontal constriction; but, if an hour elapses without the least change in the case, we have reason to infer that two, or even four hours may not suffice to remove the difficulty; and we are always justified in taking away the secundines in that time, even should we not be prompted to do so earlier. It is, in general, not difficult to overcome the stricture, by introducing, first, the hand into the vagina, and then inserting one, then more fingers along-side of the cord, until a sufficient portion of the hand is introduced to command the placenta.

But I can truly say that I have never yet met with an hour-glass contraction in which I was not compelled to separate the placenta with my hand.

I cannot well conceive of an hourglass contraction, independently of a preternatural adherence of the after-birth to the womb.

I suppose that when the after-birth is so firmly attached that the contractions of the womb cannot slide it off, the substance of the placenta acts as a soft splint—counter-extending the utero-placental superficies. The rest of the womb, having nothing to antagonize it, contracts as usual, leaving the placenta shut up in an upper cell. It usually contracts at the upper extremity of the cervix; sometimes, as where the placenta is situated upon the side of the womb, and cannot be displaced by its contractions in consequence of the preternatural adherence, the cell in which it is contained is on the side of the womb, and the fingers, in dilating the constricted part, must be conducted to the right, or to the left, or to the front, or backwards into the chamber containing the after-birth, as the case may be.

If this explanation be just, there is no very well-founded reason to hope for the spontaneous expulsion of the after-birth—for the adhesion will not give way after the birth of the child, if it would not do so just before that event. Hence, the indication in hourglass womb is, perhaps, to deliver at once, and I now heartily and warmly advise the Student to introduce his hand and separate the placenta, as soon as he can clearly determine that the real hourglass contraction does exist. He will be compelled to do so sooner or later—and the sooner it is attempted, the easier will it be effected.

What can be more disagreeable, or even distressing, than to be compelled to carry the hand and half of the forearm inside of the body of a patient already weakened and exhausted by the labor, and above all, to be obliged to remove from the womb while she is agonized, the adhering mass, which sometimes is so firmly united as to be apparently confounded with the texture of the womb. I am sure that, in performing this painful office, one is occasionally obliged by a sense of duty to the patient to continue the effort to get off the placenta, even when far from certain that he is not either leaving portions of the lobules still united to the uterus or perhaps injuring the uterine tissue itself; all that can be expected of any practitioner, under such circumstances, is that he should faithfully do his duty according to his ability. If he cannot get off the whole after-birth, he must leave portions of its lobules. Let him, however, always try to get every vestige of it off. To leave an ounce adhering is better than to leave a pound, and he can and ought to protect his own credit against any untoward results, by a full and candid statement of the difficulty he has met with, and of the impracticable nature of the case. I have taken away a great many such, and all of the women save one have recovered, even where I was certain that my utmost care and desire to succeed in removing the whole had been in vain. The Student will learn that he will rarely, in practice, meet with these vexatious adhesions, in cases that go on regularly and with a proper celerity; but if he have a labor that gives him great trouble and long detention, from irregular action and feebleness of the pains, he may justly fear that the after-birth will not come off easily. I doubt not that a very firm adhesion of the after-birth is capable of greatly impairing the regularity and strength of the uterine contractions. Such an after-birth, by preventing that part of the womb in which it is situated from contracting in due proportion with the other parts of the organ, is probably the cause of most of the difficulty we have to contend with throughout the whole parturient process in such a case. When the placenta adheres with such preternatural force, the uterine surface on which it rests is to a certain extent splinted or counter-extended during the contractile efforts of the organ.

If one could suppose a placenta converted into bone, and retaining such preternatural union with the womb, it is clear that so much of the organ as should be united to it could not contract, and that all the rest of the womb might contract, shutting the ossified placenta within a cell.

But, in fact, when the adhesion is so strong that the uterus cannot abolish it by its contraction, the same result is virtually attained as if the ossification above supposed should really exist.

Hemorrhage following delivery of the After-birth.—The application of a compress, made by folding one or two napkins, and securing them upon the lower part of the abdomen by the common bandage, is a precaution that ought never to be overlooked where there is a great disposition to hemorrhage. Such a pressure not only prevents the womb from filling again, but it tends very successfully to secure a firm tonic contraction of the organ. Besides this compress, we shall find that the sacchar. saturni, combined with opium, in doses of three or five grains of the former with from half a grain to a grain of the latter, repeated in an hour, offers us a very useful resource in the styptic influence of the acetate of lead. In like manner, infusion of red rose leaves, with elixir of vitriol; powders composed of five or ten grains of sulphate of alumina, with a few grains of nutmeg; and the application of cloths pressed out of cold vinegar, and water to the pubes; all these are measures that must be sometimes resorted to, when the flow of blood continues after the delivery of the secundines has taken place.

Violent and dangerous effusions of blood sometimes come on immediately after the delivery of the placenta, and at a time when the labor is supposed to have been terminated in the most successful and fortunate manner. If half an hour elapses after the delivery of the after-birth without any flooding, we shall rarely meet with it, and may, for the most part, consider the patient safe. Nevertheless, it does, sometimes, come on many hours later; or even many days are passed, without any apparent tendency to the accident, before the female is attacked.

The causes of this bleeding are to be sought for in the relaxed state of the womb, arising from loss of power in its muscular element. The cases are almost invariably connected, too, with an excited and impetuous circulation, by which the blood is propelled with such power and momentum into the uterine arteries as to force open their extremities, when they are not sufficiently supported and constringed by the muscular contractility of the uterus.

Such an attack ought to be foreseen in the state of the pulse, and obviated by the use of such measures as may serve to abate the violence of the blood's motion; and the patient ought not to be abandoned by the physician, until he has become fully satisfied that the danger is past. Let the patient lie in a truly horizontal posture; let blood be taken from the arm if required; let cool drinks be given, and cold water applied to the face and forehead; and let great care be taken to ascertain, from time to time, by the touch externally, whether the womb is firmly condensed or not. It is not good, I am sure, to allow the napkins, that are often applied to the vulva, to be too firmly pressed to the parts; they act, when so pressed, as a sort of tampon, which enforces the coagulation of the blood in the vagina, and that itself is often a dangerous tampon. The blood which cannot escape accumulates within the womb, and constitutes a concealed hemorrhage, that is likely to increase with a frightful rapidity, that may sink the patient irrecoverably by the time it is discovered. When blood has once escaped from its vessels, it is of no further service in this case at least, and therefore the sooner it is got rid of, the better for the sufferer.

If the Student should find the hemorrhage not to be stayed by his treatment, let him press his fingers, gathered into a cone, firmly down upon the aorta, near the umbilicus. If the patient should not be troubled with extraordinary obesity, he will be able to feel the throb of the aorta with the points of the fingers. Let him compress the tube according to his judgment, in such a way as to check the downward rush of the torrent. This will operate usefully in two ways: first, by lessening the force with which the blood reaches the bleeding orifices, which will then have an opportunity to close themselves, more or less completely; and second, by causing a greater determination of blood to the encephalon, whereby the tendency to deliquium will be lessened. Many lives have apparently been saved by thus compressing the aorta.

I have always governed myself as much as possible by the rule acted on and enforced in his lectures by the late Professor James, which was, "Don't leave your patient for one hour after the termination of the labor." The pressure of business upon a medical man in a large practice will sometimes make it impossible to stay so long near the lying-in woman, but, when under the necessity of leaving her, he ought always make arrangements for his recall in case of need. Leaving a newly-delivered woman a few minutes after the deliverance, he exposes himself to the shock of hearing, upon his return to his house after one or two hours, that "Mrs. B. wants him immediately, as soon as possible—has sent again and again—they think she is dying!"

I have many times been saluted with such messages, and it would be difficult to express the emotions they excite. It is true that most of the cases are neither fatal nor even dangerous; yet occasionally a woman is found to sink and die, almost without warning, from effusions of blood which either flow out upon the bed, or are retained within the vagina and womb, distending them enormously, without giving rise to the least suspicion in the friends or nurse that the woman is bleeding.

In case of being summoned in this sudden manner to return to the patient, it is obviously the first duty of the physician to make sure of the state of the womb; and accordingly, as soon as he reaches the bedside, he should place his hand on the hypogastrium in order to learn whether the organ is too much distended; if it be found too large, his course is plain—he must break up the clots which fill it and press them out. This is to be done in every such case. If it be not too much distended—and yet there are those signs of weakness which show that the patient has lost too much blood, while no great external or open flooding has taken place—he should still act as if there were really a hemorrhage. Let him then introduce one or two fingers into the vagina, and he will be almost sure to find that the tube is filled to distension with a very solid clot—a clot as large, perhaps, as a child's head, and extending up into the womb. Upon tearing this clot with his fingers, and pressing at the same moment with the other hand on the lower part of the belly, and exhorting the woman to bear down, the coagula are expelled with more or less violence, and the woman immediately expresses herself as relieved. I must reiterate in this place the injunction, never to forget that in uterine hemorrhage all proper measures must be taken to cause the womb to contract; never to forget that with a condensed womb there is no hemorrhage, nor that the womb will nearly with invariable certainty contract or condense itself, if some antagonist or distending force does not prevent. Remove or withdraw, therefore, the antagonist force, and the patient is saved. Always turn out the clot.

The bandage for the abdomen ought never to be omitted in these cases of flooding, for the belly being suddenly evacuated of the contents of the womb, there is produced a feeling of inanition and weakness, that often is, alone, able to bring on faintness, or a state approaching to it; and that is highly conducive to the increase of uterine hemorrhage. I have already, in my remarks on labors, spoken on this topic, and will refer my readers to page 360 of this volume.

I have long been impressed with the beautiful simplicity and graphic fidelity of the following affecting story, from the pen of the celebrated

Mauriceau; and as his writings are little known in the United States, I have, on that account, as well as for the intrinsic practical importance of the case, resolved to translate it for this part of my work. Those who read it must, I think, agree with me, that it conveys a most instructive lesson to the Student of Midwifery, and, if I am not mistaken, will require no apology for its introduction here.

Case of Mauriceau's Sister.—"Many women (says Mauriceau, liv. i., p. 158) have perished, together with their offspring, for want of prompt assistance on such occasions [hemorrhage]: and not a few have escaped from an otherwise inevitable death by early succor; while their children have received the holy sacrament of baptism, of which, but for that aid, they would have been deprived. Guillemeau, in liv. ii., chap. 13, of his *De l'Accouchement*, mentions six or seven cases confirmatory of this truth, in most of which it is seen that both the mothers and their children were the bleeding victims of want of promptitude in delivery under such circumstances, while some of them escaped in consequence of early assistance. But, that I may confirm this doctrine by the results of my own experience, I shall relate one case, among many, that is very remarkable; and the remembrance of which is so vividly impressed upon me, that the very ink with which I now am writing, in order to make it known for the benefit of the public, seems to me to be turned into blood; for on that piteous and fatal occasion, I witnessed the effusion of a part of my own vital fluid, or, to speak more correctly, the whole of what resembled the blood of my own veins.

"It was sixteen years ago that my sister, who was not yet quite twenty-one years of age, about eight months and a half gone with her fifth child, and at the time in excellent health, was so unfortunate as to hurt herself, though to all appearance very slightly, by a fall on her knees, the belly at the time striking the ground; subsequent to which she passed a day or two without experiencing any considerable inconvenience, so that she neglected to keep herself as quiet as she ought to have done; but on the third day, at about eleven o'clock in the morning, she was suddenly seized with strong and frequent pains of the belly, which were also accompanied by a great discharge of blood from the vagina. She immediately sent for the midwife, who was not too well versed in her occupation, and who, when she arrived, informed my sister that it was necessary, before delivering her, to wait until the pains should spontaneously open the mouth of the womb, assuring her that she had nothing to fear from the accident, and would be soon delivered, because the child presented very favorably. In this way, she fed her with vain hopes for three or four hours, until, the flow of blood continuing very great, the pains began to leave her, and the poor lady fainted away several different times; upon seeing which, the midwife requested that a surgeon might be sent for to assist her. They came immediately to my house, to notify me of the affair; but being unfortunately not at home, they called on one, who, they supposed, was one of the ablest obstetricians or surgeons in the whole city at that period, and he was immediately conducted to my sister's residence, where he arrived about four o'clock in the afternoon. Having seen the state she was in, he contented himself with merely saying that she was a *dead woman*, for whom nothing was wanting but the last sacraments of the church, and that it was absolutely impossible to deliver her. To all this the midwife readily agreed, for she thought the opinion of this man, so universally esteemed, must be, beyond doubt, correct. As soon as he had pronounced his judgment, he went away, refusing to stay any longer; and in this deplorable condition, and without offering the smallest succor, he left this lady, whose life, as well as that of her child, he could certainly have saved, had he delivered her then, which he might easily have done, as will be seen in the sequel of this history.

"After the judgment of a person of such great reputation, added to that of the midwife, every one who was present thought that since M. ——— could do nothing for her, there could be no other recourse, in so great a misfortune, than placing confidence in God, to whom alone everything is possible.

"They now endeavored, as well as they could, to console my poor sister, who with a passionate earnestness desired to see me, that she might know whether I also would pronounce the same judgment upon her; and whether her disease, which was constantly growing worse, was beyond all remedy; for her blood was steadily flowing in great abundance. At last, I returned to my house, where they had been a long time before, to tell me this sad news; and where, most unfortunately, I was not to be found at the time, as I have already related. As soon as I heard of it, I hastened to her house, and upon arriving there, saw so piteous a spectacle, that all the passions of my soul were, at the sight, agitated with many and different emotions; after which, having somewhat recovered my composure, I approached the bedside of my sister, who had just received the last sacraments; and being there, she implored me again and again to assist her, saying, that she had no hope but in me. After I had learned from the midwife all that had happened, and she had told me of the opinion of the surgeon, who had seen her more than two hours before, for it was now past six o'clock, I perceived that the blood still continued to flow profusely, and without ceasing, though she had already lost more than three quarts, and, what is remarkable, more than forty-eight ounces within the two hours since the surgeon left her—as I supposed from the quantity of the napkins and cloths, which were all saturated with it; which blood, by remaining in her body, had she been timeously delivered, would, beyond doubt, have saved her life. I also saw that she was seized almost every minute with sinking turns, that were increasing; which convinced me that she was in far greater peril than she could have been had they not lost the opportunity of delivering her two or three hours sooner, which was both possible and of easy execution; for at that time she had almost the whole of her strength, which she afterwards lost by the continual effusion of her blood. Wishing to know whether it was true that she could not be delivered, I found, upon examination per vaginam, the orifice of the womb dilated, so as easily to admit two or three fingers. Having remarked this, I made the midwife examine her again, in order to ascertain whether the os uteri had been in the same state when the surgeon stated that she could not be delivered; and whether she was still of his opinion: she told me, 'Yes,' and that the parts had remained unchanged ever since he had gone away. As soon as she made this declaration, I perceived her ignorance, and what had been the difficulty with the surgeon. Touching this, I told her of my astonishment that they had both been of such an opinion, as I was of a wholly different opinion—for it would have been as easy for him to deliver her then as now; which I should, in truth, have immediately done myself, could I possibly have commanded my judgment, long vacillating upon this resolution, which, from the loss of all hope from other quarters, I was at last constrained to adopt. What hindered me was, not the prognostic of the surgeon, celebrated as he was, who had persuaded everybody that to deliver her was impossible, (for it would seem like rashness to resist the dicta of those who are looked upon as oracles,) nor the weakness of the patient; but it was chiefly the quality of the person, who was my own sister, and whom I tenderly loved, that agitated my mind with various passions. For my mind was so preoccupied with seeing her ready to expire before my eyes, from the prodigious waste of that blood that had sprung from the same sources as my own, as to make it impossible for me to come to an immediate resolution and action. This obliged me to send incontinently for the surgeon who had left her so long before, and beg him to return to her house, so that I might show him how easily she could be delivered—and by making him understand and confess that there is no hope on such occasions except in prompt delivery, induce him to operate, instead of leaving the mother, as he had done, to despair, and allowing her infant to perish without baptism, which it might have enjoyed had he obeyed the requirements of the art, which are, that if both cannot be saved, we should, at least, try to save the child, if that be possible without doing anything prejudicial to the mother. But he would not come back for all the prayers and solicitations that could be offered; and excused himself by saying that it would be impossible to do anything in such a situation. As soon as I learned all these things, I sent for another surgeon, with whom, had he come in time, I should have concluded in favor of the necessity of the operation, of the possibility of which I could have satisfied him; but, as misfortune would have it, he was absent from home. Meanwhile, at least an hour and a half more elapsed, during which the blood was incessantly flowing, and the faintness increasing more and more. Finding myself, therefore, hopeless of the aid of the persons I had sent for, I resolved to deliver her myself immediately, for I had not been able to resolve upon it, except in this extreme necessity, for the reasons already given; which, indeed, was somewhat too late for the mother; for, had I been able to command myself sufficiently to proceed to the delivery at my first arrival, there was great reason to hope for her safety, as it afterwards proved as to her child, when I had completed the task in the following manner:—

"I introduced two fingers into the orifice of the womb, which was open enough to receive them; I then gradually inserted a third, and little by little, the ends of all the fingers of my right hand, with which I so dilated the orifice as to admit the whole hand, which is readily to be done on such occasions, because, as has been already said, the abundant discharge of blood moistens and relaxes the entire womb very much. Having introduced my hand very gently, I found that the head of the child presented, and that the waters were not yet gone off, which obliged me to break the membranes with my finger nails. Having done this, I immediately turned the child so as to draw it down by the feet, which I easily effected, as I shall describe the operation in the 13th chapter of the second book. The operation was effected in less time than it takes to count a hundred, and I protest upon my conscience, that I never in my life performed an accouchement (of a preternatural case) with greater ease and expedition, or less pain to the mother, who never complained in the least during the operation, notwithstanding she then was quite herself, and knew perfectly well what I was doing.

Indeed, she found herself quite relieved, as soon as I had delivered her, whereupon the flow of blood began to cease.

"As to the child, I delivered it alive, and it was instantly baptized by a priest who was in the chamber. The patient, and all the bystanders, who were numerous, then perceived very clearly that the surgeon and midwife, who had pronounced it impossible to deliver her, had done so without any good reason.

"The operation was performed in good time to procure baptism for the child, who received it, praise be to God, as I just now said; but it was too late to save the life of its mother, who died an hour after its birth, in consequence of having lost too great a quantity of blood; for she fell into a great swoon, like those she had had previously to the delivery. The flow of blood ceased, it is true, but there was not enough left in her body to resist these frequent syncopes, which she could doubtless have done, had the surgeon, who saw her first, delivered her three full hours earlier, as he could have done, without doubt, as easily as I did it; since which time she had lost, without exaggeration, more than eighty ounces of blood, twenty of which, had it been reserved, would have insured her escape; particularly, as she was a young woman, of a good constitution, free from all disease or inconvenience at the time she was attacked by this fatal accident, which happened, as before said, at eleven o'clock in the morning. She was delivered at seven in the evening; but the operation was unsuccessful for her, because she had been drained of blood; she died an hour afterwards, in full possession of her senses, and speaking until the last moment of her existence, which was at eight o'clock, P. M."

Convulsions.—Among the severe and dangerous disorders to which pregnant and parturient women are liable, may be classed the puerperal convulsion, as one of the most dreadful. It never occurs without carrying dismay among all those who take a near interest in the patient; whom it exposes to the greatest risk, by the violent affections of the brain with which it is connected.

Dr. Collins (*Practical Treatise*, p. 199) says: "There are few circumstances more calculated to alarm the practitioner, or excite terror in the friends of the patient, than the occurrence of convulsions during the progress of labor; and the result, both with regard to the mother and child, proves the danger serious."

I have already spoken, in a former page, of the excited state of the blood-vessels that accompanies labor; and I think that, in view of the rapidity and momentum of the circulation produced by that state, no surprise ought to be felt at the occasional appearance of convulsions.

If the extreme violence with which during labor the blood rushes along the arteries of the encephalon, be taken into consideration, it will be seen that the brain must, under such an excited circulation, be brought into a state of the highest nervous activity, and the functions of innervation become so considerably and irregularly augmented, in consequence, that the muscles of the body may readily fall into irregular convulsive movements. The activity of the functions of the brain and spinal marrow is always increased, proportionally, with the quantity of blood circulating through those structures; a woman, therefore, in whom the pulse is uncommonly hard, frequent, and large, ought, *cæteris paribus*, to be deemed more obnoxious to the convulsion than a woman in a directly opposite state. Accordingly, I think it will be very rare to meet with the malady, except in such as have a very bounding and tense pulse. Let it be early noted, and with great care obviated.

The long-continued pressure of the womb upon the great vessels in the abdomen cannot fail, in some women, to retard, to a certain extent, the flow of the blood along the branches of the aorta below the point compressed by the womb, as has most judiciously been observed by Puzos; and we daily witness the effect of that pressure on the veins and absorbents, in the temporary varices of the veins, and in the œdematous limbs, of the latter stages of pregnancy; symptoms which are observed to vanish with the removal of the cause of pressure. This removal takes place by the birth of the child and the subsidence of the womb into the excavation of the pelvis, after delivery. The same causes of pressure, by impeding, in any degree, the downward flow of the aortic blood, must give to the mass of blood a disposition to mount upwards, and linger in the vessels of the brain and upper parts of the body. They occasion a congestion and irritation of the brain, characterized by headache, confusion of thought, vertigo and delirium, resulting in convulsion or apoplexy. The merest tendency to such results is worthy of the most solicitous regard and anxious attention. Let a pregnant woman in this way acquire the habit of congestion in the brain, and if, as soon as the efforts of labor come to superadd their power to this dangerous predisposition, we omit all regard and care for such symptoms, there will be more than a probability of our having to contend with the disorder now under consideration. A writer for the *British and Foreign Med. Review*, among other faults discovered in my work, is very much astonished to find that I am ignorant of the fact that eclampsia is attributable to altered plasticity of the blood, rather than to the violent determinations above described and explained. As to strictures of this class—whether as to the substance or form of my writings—I am somewhat like the Frenchman, who, being asked whether he cared for the sermon, replied, *ordinairement jamais*. I am sorry, however, that the reviewer himself should not have discovered that five minutes of puerperal eclampsia can do more mischief in altering the blood's crasis, than nine whole months of gestation, and that the women who are well and happily treated during convulsions often appear to be as well after a day or two as if nothing extraordinary had happened.

It is far better to ward off than to cure an attack of puerperal convulsion. No one can look upon the case, with due comprehension of its nature, and not fear that a fatal effusion or extravasation will take place during the attack. It is very well known that not a few instances do occur wherein the fatal blow is struck at the very onset, and that some women never speak, nor exhibit the smallest sign of reason or sensation from the moment of invasion, but sink at once into the stertorous apoplectic sleep that leads rapidly to the sleep of death.

The state of pregnancy, for some women of a susceptible nervous constitution, is rather a pathological than a physiological condition. The woman labors under constitutional irritation from the commencement of her pregnancy, and never feels well until she is delivered. She is fretful and peevish; ceases to be amiable; and the conservative powers of the constitution being at last defeated and overthrown, the fruits of the disorder are seen in puerperal insanity or convulsions. Such a state both causes and maintains a vitiated condition of the circulation, which should be met by venesections, repeated according to the enlightened judgment of the medical attendant; by purgatives or aperients; by counter-irritants; by a judiciously regulated diet; by regulated exercise; by baths; by proper clothing; and by the removal or prevention of all causes of mental solicitude or excitement; for the patient, under such circumstances, is in a state which Wigand calls by the expressive term *convulsibilität*. I have treated several cases of pregnant women affected with what I deemed to be clearly-marked symptoms of this convulsibility; symptoms with which they were repeatedly annoyed during several months of the gestation. In some of the instances, I have failed to ward off the threatened attack, whereas, in far more numerous examples, I have seemed to succeed in preventing the onset of the eclampsia. The obviating measures here alluded to consist in venesections, in regulated diet and exercise, and aperient medicines. But in order to the suitable prescription of all these agents, the physician ought to see the patient occasionally, before the completion of her term. Hence, the public ought to know that counsel should be taken of the physician, from time to time, for all pregnant females who do not enjoy good health during gestation. If such counsel were sought for at an early period, the attack of convulsion would not, in general, take place: most of the cases come on when not in the least expected or anticipated by the members of the family, and, as I have already expressed it, "the fatal blow" is sometimes the first and the last one; the patient sinks at once into coma, and dies, without ever recovering her senses.

The attack of convulsions has been supposed to have some connection with irritation of the nervous system occasioned by the *dilatation* of the os uteri. Possibly this may in some examples be true, yet we meet with many cases where the os uteri is fully dilated before the seizure, and not a small proportion are met with in persons who have already been delivered. At page 200, Dr. Collins, in speaking upon the idea that the dilatation of the os uteri is causative of the disorder, says: "This fact might be brought forward to support the opinion that puerperal convulsions are caused by the irritation produced in the dilatation of the mouth of the womb. This, however, is not the case, as we not unfrequently find patients attacked when the os uteri is completely dilated and all the soft parts relaxed. I conceive we are quite ignorant as yet of what the cause may be; nor could I ever find, on dissection, any appearance to enable me to even hazard an opinion on the subject."

Nevertheless, since the introduction of ether-inhalation in Surgery, and the proposal to use it in Midwifery, the anæsthetic powers of the ether and other articles employed in that way have served to shed no little light upon the state of the brain in our eclampsia: in my *Letters to the Class, sub voce*, I have expressed my views upon the nature of the alterations discoverable in the functions of different parts of the encephalon during eclampsia.

While I admit that the attack, or onset, is caused by long-continued or violent determination to the head by the rapid revolution of the blood, excited by pregnancy and labor, or by the too intense perception of the pains of labor, I conclude that the profound insensibility ought to be regarded as an anæsthesia caused by the presence of much black blood in the brain; that when the black blood grows blacker and blacker, so as to render the patient dark as an Ethiop, the convulsion is nearer and nearer to its close; that as soon as the black blood comes to circulate freely in the cerebellum, the convulsions cease—and that, if it pervades the medulla oblongata, the patient dies for want of power in the sources of the vagus nerve. An individual might perish very soon from inhaling ether or chloroform, which is capable in certain persons of carrying its anæsthetic force first upon the respiratory brain. But, if the respiratory brain forget in its sleep, or in its asphyxia, to cause the respiration!

The author before cited, Dr. Collins, in a foot-note on p. 200, states, "that of nineteen cases recorded by Dr. Joseph Clarke, sixteen were first children. Of thirty-six by Dr. Merriman, twenty-eight were first children. Of thirty by himself, twenty-nine were first children. So that of the eighty-five cases, seventy-three were first pregnancies." In twenty cases of convulsions under my own notice, twelve were first pregnancies, and one not known.

Under the dreadful circumstances of this disorder, one reflection ought obviously to strike the mind of the medical attendant; it is, that if the woman were not pregnant, she would not be assailed by the disease; and the inference very justly follows, namely, the pregnancy ought to be terminated in order to put a stop to the malady. For whether the assault has depended remotely on mere pressure on the great vessels, or on that more metaphysical state called sympathy of the brain and womb, we shall enjoy a far better prospect of rescuing the woman if she can be delivered, than we shall if the womb remains unemptied.

But can we deliver—ought we to deliver—when and how shall we deliver, the woman? We can deliver if the womb is dilated or dilatable. We ought to deliver, provided we find that the discordant operations of the womb and constitution are likely to fail of promptly bringing the child into the world; for, although the womb sometimes acts with great power during convulsion, and is successfully aided by the violent, irregular, and spasmodic constriction of the abdominal muscles and other accessory forces of parturition, it also happens that the child, in some other instances, makes no progress at all, and the convulsions, returning at short intervals, afford but small prospect of escape for the patient, inasmuch as they will be likely to continue until the pregnancy is brought to a close by the delivery of the entire ovum.

It is, therefore, always desirable that the patient should enjoy the benefits of as early an accouchement as possible, but it must never be forgotten that the attempt to effect it must be regulated, entirely, by the fitness of the parts for the operation. There can be no excuse for forcing the hand into an undilatable os uteri, under any circumstances; and if the medical attendant be ever so anxious to give his patient every possible chance of safety, he will not be excusable, if, on that account, he rather adds to, than diminishes, the risks of her frightful disorder, by intempestive violence in the introduction of his hand. It is true to say, that "anceps melius quam nullum remedium;" but let not this trite aphorism lead us to the commission of positive mischief, under the impression that we are about to employ a *doubtful* remedy. Happily for us, however, delivery is not the only resource to which we can appeal in our anxious wish to put an end to the danger and distress of the scene before us.

What are the circumstances of the case? The patient has, perhaps, complained of severe pain in the head; she is under the excitement of labor; she is heated; the pulse is hard, full, and bounding, and greatly accelerated. On a sudden, the muscles of the whole body become convulsed, and the patient writhes, and every feature and every gesture are horribly distorted; the respiration is attended with a hissing noise, and bloody froth issues with violence from betwixt the teeth, which are rapidly opened and closed by spasm, wounding the tongue, and giving rise to the peculiar hissing sound above mentioned. The eyes are rolled upwards, or moved in opposite directions; and after a greater or less duration of the paroxysm, the patient sinks into a stertorous sleep, or profound coma, from which she is roused only by a renewal of the convulsive movements, or to mutter in the intervals incoherent or inarticulate sounds. Here, then, we have the proofs, as they are also the results, of a preternatural development of the innervating functions of the brain and spinal marrow, caused or maintained by an undue momentum of the cerebral circulation. The remedy is, first, to moderate the excitement by venesection and evacuants, and, second, to remove the cause by delivery. By the abstraction of blood, we can weaken the force of the circulation of the whole system; we can make the heart beat gently, and cause it to send the blood in a milder current into the vessels of the brain; we can thus diminish the innervative function of that organ, and control the muscular excitement, while, at the same time, we abate by the remedy the hazard of extravasations of blood in the substance of the brain, or of the effusion of water into its ventricles. If there be a case of disease in which bold and daring employment of the lancet is demanded, it is the case of the puerperal convulsion. It is scarcely worth while, almost, to open a vessel to draw off eight or twelve ounces of blood. The patient ought to lose from thirty to sixty ounces at one venesection, if possible; and if signs of faintness appear, they should be hailed as the harbingers of success. They will not appear, unless the brain is already, in some measure, freed from its state of tension; unless the blood is no longer pushed upon it with such force as to excite it beyond measure; and if the mischief at the onset was not too great, there will be a greater chance of saving the patient, provided they come on. But this bleeding must be promptly begun, and rapidly executed. It is perhaps already too late, when the darkening countenance and livid fingers exhibit the evidences of a considerable progress towards asphyxiation.

While we thus endeavor by the use of the lancet to diminish the momentum of the mass of the blood, which is propelled in vast quantities upon the brain, we ought not to omit the use of other available means of moderating the turgescence of the vessels of that important organ. The general bleeding should be followed, very soon, by the application of cups to the temples and back part of the neck, and the hair ought to be cut off, and shaved clean, so as to admit of the application of leeches to the scalp, and the subsequent use of ablutions of the head with iced water and vinegar; or the use of an epispastic, with which the scalp should be covered, if the coma and other symptoms of local disorder are not in a favorable train of abatement. Sinapisms ought to be freely applied to the lower extremities, and to the abdomen; and the location of them should be changed, from time to time, so as to keep up a constant irritation of some distant part, with a view of diverting the sanguine mass from the cerebrum. Enemata of salt and water, or of jalap mixed with water, may be made occasionally, as a further means of diversion to a safer part of the body, while they also speedily unload the perhaps overcharged bowel. During the administration of so energetic an antiphlogistic treatment, it is in course afterwards to observe the most rigorous regimen: indeed, until the dangerous symptoms are gone off, very little aliment is admissible: solutions of gum, portions of barley or rice water, and where absolute weakness demands it, sago or arrowroot jellies, may be given occasionally, yet with great caution. Darkness, repose, silence, should all be considered essential prescriptions, in a case where so important an organ as the brain is concerned, and where the slightest irritations are sufficient to turn the scale in an unfavorable manner.

Though long-continued ill health may be, in general, expected to follow severe attacks of puerperal convulsions, and, though nothing but the most constant care and watchfulness can avert many evil affections, the sequelæ of a state the most unnatural and trying to which the female constitution is obnoxious, it still is true that many women are no sooner out of the paroxysm than they seem to be well again.

I shall relate some cases of puerperal convulsions that have fallen under my notice, with a view to illustrate for the Student the mode of proceeding under such circumstances. I find, in my case-book, the following entry, for example :—

CASE.—To-day (March 24th, 1851) I was called at 5 A. M. to see F., æt. 19, primipara. She had had labor pains all night. Face flushed, hands red, pulse above 100, large and hard. With every pain she had pulsating distress in the forehead just above the eye. I said to her husband that she was in danger of being convulsed in the course of the labor, which must prove a tedious one, for the os uteri was as large as half a dollar, and very rigid, the perineum excessively hard and thick, and the vertex in the fourth position.

She declined being bled, making excuses, particularly in averring that the bad ache was gone. At 8½ A. M., I went out to pay visits, and ordered her to be bled ten ounces at 9 o'clock, and take oil. The bleeder came, but she put him off. When I arrived again, which was 10 A. M., I had ten ounces drawn from the right arm, which let her pulse down. At about 2 P. M. the head reached the perineum, but was still not rotated. The waters were now discharged, and at 3 P. M. the vertex was got to the symphysis pubis. The pains began now to be of little force, though repeated every three minutes, and lasting about forty seconds. At 4 o'clock, I perceived her eyes fixed as in ecstasy. I spoke to her, when she made an incoherent reply, and went into a most violent convulsion. I immediately opened a large median vein in the left arm, and allowed the blood to flow until she became quiet, and the pulse had sunk very low. I got some fourteen ounces, which, with the ten before lost, made twenty-four ounces. As soon as I had done this, I cut off her hair, and covered the head with a wet, cold napkin, applied sinapisms to the legs, and ordered a salt water enema, which did not operate, she having had three dejections in the preceding night.

I also sent a message to Dr. Huston, and one for my forceps. Before Dr. Huston came, she had perfectly recovered her senses, but the pulse came up well, and was indeed too strong.

I applied the forceps and delivered her slowly, say in half an hour, of a son, in good health. The child was not a large one (about seven pounds). The placenta came off soon and well.

After the child was dressed, she took it and kissed it, and remained perfectly well and comfortable for more than an hour, when she had a second and most violent eclampsia, followed by apoplectic stertor, from which in half an hour she was quite recovered.

As soon as she could swallow, I gave her thirty drops of laudanum, and after that, 16th-grain-doses of tartar emetic. She took three such doses and vomited, since which time she has been comfortable. I drew the water at 10 P. M.

25th. This morning I found her comfortable; has slept well. I drew the water again at 10 A. M., and at 6 P. M. The pulse is good, no headache, and in all respects as well as I could desire her to be.

Sunday, 29th March. She has had not the least indisposition since last record, saving that I have used the catheter twice daily, being unwilling to allow her to rise to the commode. From this time she recovered steadily, and regained her ordinary health.

CASE.—March 13th, 1838.—Mrs. M. in labor, first pregnancy. I was called on Sunday night, at two o'clock. She lacked fifty-nine days to the completion of her term; was in strong labor pains, evidently of the dilating kind. They returned every five or six minutes. She was sitting up in a chair, with her hands very cold, complaining of intense pain of the head. The pulse was very large, and as hard a one as I ever felt; it beat one hundred and fifteen times in a minute. In consequence of the circumstances above mentioned, I bled her to the amount of fourteen or fifteen ounces; upon which the pulse was softened, and the headache became milder. It had been most violent at the inferior occipital region, which it now abandoned in order to occupy the forehead, temples, and crown. Notwithstanding the bowels had been moved, I gave her some magnesia, seeing she had vomited several times, and hoping that some alvine discharges would assist in calming the violent disturbance of the circulation within the brain.

In the morning, she got an enema which operated freely, yet the headache continued to be severe, and the pulse somewhat tense. There was not a great degree of heat, and I expected to find a diminution of the vascular excitement from a severe flooding, which came on at eight o'clock. At nine A. M., the os uteri was about the size of a dollar, hard and unyielding.

At twelve o'clock, my patient complained of *severe* pain in the head, and said to me, "I can't see you; I feel quite confused." As soon as these symptoms were made known to me, I was fearful of the approach of a convulsion, and immediately proceeded to tie up the arm; but before the blood began to flow from the vein, which was opened, she had a most violent convulsion. I allowed the blood to flow until the pulse became reduced, and then the convulsion went off. I did not take more than eight or ten ounces, which was a very small quantity, in view of the effect to be produced, and actually produced by the operation. Sinapisms were applied to the feet. Mrs. ——— remained in a state of insensibility for twenty or thirty minutes after the disappearance of the convulsive movements, and then recovered her senses. She now had a very considerable flooding, which continued to trouble her during the morning.

As soon as the spasms ceased, I ruptured the membranes, and the fœtus, which was dead, was expelled at half-past twelve o'clock. It was living at seven in the morning.

She had no more spasms or convulsions after this, but the pain, like a *clou* (or nail in the head), was so violent that I ordered leeches to the temples in the afternoon, and gave her a proper dose of salts and magnesia. The pulse continued to abate of its violence regularly. The medicine operated freely; but at seven o'clock the following morning, she was leeched again on account of pain in the head, and was perfectly comfortable from that time. This woman was dressed, and walking the floor within four days after her accouchement, and continued well.

As regards this case, I presume any one of my fellow-practitioners would readily say that it was well managed, notwithstanding the smallness of the second bleeding, since I resorted early and promptly to the use of proper remedies. I conceive that the resort to venesection in the first visit was highly expedient, and though it did not ward off the threatened convulsion, it doubtless mitigated it, and rendered it more manageable by the subsequent treatment. The only real resource in the puerperal convulsion is in the use of the lancet; and the rule ought to be established that a woman is menaced with convulsions, if she is affected with headache near her term, especially if that headache be referred to the crown, or to some point (clou) that could be covered with the end of the finger. I intend never to hear such complaint without pondering upon the value of the indication it throws out, namely, that the lancet, the lancet, and nothing but the lancet, is worthy of our confidence. I shall make these same reflections in similar circumstances of pregnancy even when not advanced beyond the sixth month, having lately had occasion to witness a desperate attack in a young primipara five months gone in her gestation.

CASE.—March 13th, 1838, called to Mrs. ——— at six o'clock this evening. She was sitting in her parlor. She expects her labor every hour, the time being out.

I said, "How d'ye do?" "I feel weak," she replied. "I cannot see more than half of anything I look at; I can only see one-half of your face: I can see only one of your eyes." I asked her to cover her right eye with her hand. "Can you see the whole of my face now?" "No!" "Cover your left eye; can you see properly now?" "No; I can see only half." "Have you any pain, weight, or dizziness of the head?" "No!" "Any sick stomach?" "No!" "How long have you been so?" "About half an hour!" "Were you ever so before?" "No!" "Any numbness or want of feeling in the hands?" "No; but my hands are cold." The pulse was about eighty-five, and a little tense, yet moderately so. The bowels not bound.

She now went up stairs, and I took four ounces of blood from the arm, having bled her eight ounces six days ago: when I had bled her, she could see the whole of my face, or the whole of any object she looked at. She did well.

It is also a curious circumstance, and one well worthy of your attention, that the blackening of the blood, or its conversion into venous blood by the interruption of the respiratory or oxygenating function, should be the means provided and designed by Providence for the cure of the paroxysm. When the whole sanguine mass has become carbonated, the brain and the spinal cord must cease to innervate the muscles convulsively; and the speedy relaxation of every rigid muscle permits the restoration to the lungs of their oxygenating power; so that, in a few moments after the countenance has been black and deformed in every feature, we have the pleasure to see it recover its whiteness, though ghastly pale; while the brain, I mean the whole brain, wakes up to the renewed performance of its organic as well as its intellectual offices. When, therefore, in looking upon these frightful scenes, you see the face of your patient growing darker and darker, you will discover in that very circumstance the hopeful announcement of a speedy close of the distressing exhibition.

I think that, in a majority of cases, you may expect to find the whole brain recover soon after the ceasing of the convulsive innervations; but this is not always the case; for, in some patients, I have noticed a profound coma to succeed the convulsions; the hemispheres, the cerebellum, and the tubercula quadrigemina, remaining oppressed and extinct, as to the power, while the medulla oblongata and the spinal cord had resumed a quasi regular exercise of their forces.

CASE.—In a case that fell under my care in this city, a few years since, the lady had convulsions, which occupied the hours from about 11 o'clock A.M. till near 5 P.M. During these convulsions, she gave birth to a dead fœtus of the seventh month; remaining wholly unconscious during the process. I say unconscious, though she moaned a little, during the labor pains, like a person disturbed by some distressing dream, or like one under the influence of ether in a surgical operation. Some hours after the last convulsive attack, and after she had been lying profoundly still, as if asleep, she moved with spontaneous or voluntary motion; showing that the cerebellum was aroused to its true office of directing or co-ordinating the power extricated by the brain and spinal cord. She soon afterwards spoke, and recognized the voices of friends, and was perfectly reasonable; showing that her hemispheres had waked up to their office of intellectual perception and combination. After having for some time spoken, and spoken well, she said, "How dark it is—why do you keep it so dark?" "It is not dark," replied I; "do you not see the candle?" "O no; there is no candle here." "Yes, dear Mrs. ——, here is the candle; see—I hold it just before your face." Her beautiful eyes were open, and she turned them at will, to look for the light which shone into their large dark pupils. "Do you not see the light?" said I, again. "O no, Doctor; why do you say so? I'm sure there's no light here." She was totally blind: that is to say, her tubercula quadrigemina were still oppressed, while the rest of her brain had recovered, being liberated from the thraldom of the congestion of black blood. After some time, the dawning light of day having considerably increased, she perceived it through a window opposite, and cried out, "Why, it's daylight!" and I then knew that the tubercula quadrigemina had also recovered.

There is a useful moral in this statement;—it is that we should look to it, in the conduct of all such cases of disease, that all the parts of the brain shall recover—and that, in so far as our measures may have efficacy, we fail not to employ them to the entire subduction of even the last vestiges of morbid action, or oppressed or suspended power. These vestiges of disease we may clearly discern in the intellection, and in the muscular innervations and co-ordinations.

The successive recovery of the different parts of the brain in this case is interesting, as it is analogous to the incidents observable under etherization. When a patient is subjected to the inhalation of ether, the different parts of the brain are affected in succession; but not always in the same succession. The sensitive cords of the cerebro-spinal axis are, in etherization, plunged into a state of insensibility—leaving the hemispheres capable to perceive and understand what the quadrigeminal tubercles see of any operation that the surgeon is performing. Or, the motor fibres are put asleep, yet the sensitive ones communicate to the conscious mind the painful impressions which the mind perceives—but which it forgets, as it forgets a painful dream.

If the etherization go very far, the hemispheres, the cerebellum, the tubercles, and the motor and sensitive cords, are all hushed in a profound state of aperception, both of the direct and the reflex influences or impressions: the medulla oblongata alone continues to do its work of irradiating the parts that are under the control of the pneumogastric. If the ether be given long enough, and in quantity sufficiently great to quell its force of innervation also, the patient dies. Hence the medulla oblongata is called by M. Flourens the life-tie—the vital knot—*le nœud-vital.* The oxygenating power depends upon it, and without oxygen there can be evolved no neurosity. Take away the ether in good time; admit the pure atmosphere to the lungs, and the functions of the whole brain are revived—so, in our eclampsia, as soon as the abnormal state of the encephalic circulation gives place to a normal, or, one more nearly normal, the brain wakes up to its duties again, and the patient sees, hears, speaks, and acts, with the most perfect co-ordination of all those vital forces that are dependent on the brain and cord.

If, in etherization, we press the administration of the drug to the point of quelling the vital-tie, the medulla oblongata, she will die, and we shall find no necroscopic lesions in the encephalon. So likewise, in the speedy dissolution under eclampsia puerperalis, the autopsy discloses no lesion of any part of the brain. She dies because the medulla oblongata is asleep or asphyxiated. Are we surprised that the woman should die without perceptible physical lesions of the brain? We are not at all surprised if she disclose none such when destroyed by ether-inhalation. May not the brain perish under the one influence as well as under the other, and yet, dying, leave no sign? In eclampsia, there is always abolition, for the moment, of the power of the hemispheres, always of the tubercula quadrigemina, and always (perhaps!) signal change in the cerebellum. All these revive, and are extinguished again and again, as the paroxysms are repeated or suspended by turns, provided the medulla oblongata perish not. When the case has come to its close, and the patient is restored, where are the lesions? No trace of them remains. But—and here is the explanation—if the medulla oblongata be affected equally with the others, the patient dies, because the sources of the respiration are cut off. To breathe is to live. God breathed into Adam the breath of life, and he became a living soul.

There are many circumstances, the concurrence of which tends to the development of the eclampsic convulsions of pregnant, puerperal, and lying-in women. For many women, the whole state of gestation, from conception to labor, is a state of nervous excitement or hyperæsthesia, which renders the subject specially obnoxious, under the application of exciting causes, to convulsive or irregular non-conformable innervation. Whether this too susceptible nature depends upon an altered crasis of the neurine, or whether it arises also from modifications of the blood, developed during the gravidity, remains to be ascertained; and it contains questions full of interest to the pathologist and the therapeutist.

Cramp.—I do not remember to have met with any published statement of cases of cramp in the legs as causes of Preternatural labor, and yet, having met with examples of it in my own practice which rendered the use of forceps absolutely indispensable, I have thought fit to relate them in this book. There is no need for great surprise at the announcement of this cause of preternatural labor, since it is well known that the compression or tension of a nerve may give rise to pain so great as to disturb in the most violent manner the functions of life. The head of the fœtus in descending may be impelled with so great a degree of force against certain of the internal sacral nerves, as to render the patient almost or quite frantic from the agonizing sensations developed thereby. Under such intense suffering, the womb may cease to act, or act inefficiently, and the practitioner, seeing that the distress of his patient is greater than she should be permitted to bear, hastens to extend to her the most prompt and efficient means of relief.

Without further discussion of the reasons which, *à priori*, should include the violent cramps to which I refer, among the causes of preternatural labor, I beg to refer the Student back to page 44, for accounts of the cases, which I have no occasion to repeat in this connection.

Prolapse of the Cord.—There are other circumstances that may suffice to convert a natural into a preternatural labor. Among these may be mentioned the prolapsion of the umbilical cord. The cord very rarely gets down below the presenting part of the child, and we have reason to be astonished at the rareness of the accident, when we consider the great length of that part of the secundines. The cord is sometimes found to be six feet in length. The mere falling of the cord could not, under any circumstances, interfere with the ability of the woman to deliver herself, because it could not inconveniently occupy any space in the pelvis to the hinderance of the birth. The importance of the accident is relative only to the child, and not to the mother. The child is placed in imminent danger of dying by asphyxia, from pressure on its umbilical vein and arteries when they fall below its head in labor. Hence, the necessity of expediting the delivery by manual or instrumental means, and the conversion of the natural into the preternatural kind of labor, either by turning or the forceps.

I do not wish to be understood as advising a resort to art as an invariable rule of practice in such cases; for it fortunately happens, in some instances, that the pelvis is large and roomy, the os uteri dilates rapidly, and the pains are sufficiently strong to assure us that the child will be born so speedily by the unaided powers of nature, as to make it unnecessary for us to interfere. The child has so good a chance for escaping uninjured, in a rapid delivery, that it is more advisable to confide in that chance, than to expose both the woman and the child to the hazards of a forced delivery. I repeat that it is a rare occurrence to meet with a cord prolapsing, after the labor is fairly begun. Indeed, the head so completely fills up the cone of the cervix uteri, as to prevent the cord from falling down betwixt the head and the walls of that cone. If we find the cord down, therefore, and the os impracticable, what madness would it be to attempt to turn before the cervix is dilated! Such an attempt would be likely to fail, or kill the patient. But if the os is dilated, and the head on the point of escaping into the vagina, we may expect, as soon as it has cleared the os, to be able with the forceps to rescue the infant, and that with almost no risk to the mother. We also have the advantage of being able, by touching the prolapsed cord, to ascertain the state of the fœtus: if the pulsations continue vigorous, we shall suppose the child to be doing well, and if they become faint and feeble, we shall be able to resort to the forceps or to turning, as the case may be. When the prolapsed cord has no pulsation and is cold, the child is dead, and of course no steps need be taken on account of the prolapsion, which, in that case, becomes a matter of indifference. Prolapsions of the cord rarely take place after the mouth of the womb has become well dilated. The cord is probably down, in these cases, before the labor begins; it is found protruding through an os uteri not larger than a half dollar. Such an os uteri is impassable to the hand; therefore the accoucheur can by no means return the fallen cord into a cavity to which he cannot have access. He makes vain attempts to succeed by pushing the cord back within the constricted circle of the mouth of the womb, from which it again immediately escapes. If he could carry the cord quite above the head, it would stay there. It is evident, therefore, that, with the hand alone, little success can be expected, in even the most patient endeavors to get the prolapsed organ in a place of safety. I have succeeded with my hand alone, but have much more often failed.

Many various methods of repositing the cord, or putting it back into the womb, above the fœtal head, have been proposed; they have mostly been found ineffectual, the cord being apt to fall down again, even after it had been put into the proper place. I have never yet had an opportunity to try a method which I beg leave to propose to my readers, and which is as follows: Take a piece of ribbon or tape, a quarter of an inch wide and four or five inches long. Half an inch from the end, fold the tape back, and sew the edges so as to make a small pocket. Then fold the other end in the opposite direction, and sew that also, to make a pocket of it. Now if the cord be taken in the tape, and held as in a sling, a catheter may be pushed into one of the pockets, and that one thrust into the other, so that we shall have the cord held as in a sling, which is itself supported on the end of the catheter or womb-sound. Let the catheter be now pushed up into the womb, beyond the fœtal head; it will carry the secured portion of cord with it, and the catheter being withdrawn, the tape is left in the uterine cavity, where no harm can be occasioned by its presence. If required, several such tapes could be secured round the cord, and all of them fixed on the end of the same catheter, and pushed at the same moment far up within the cavity of the womb.

Fainting.—Fainting or syncope, when often repeated in labor, is sometimes of so alarming a nature as to induce the practitioner to be willing to expedite the birth of the child, in order to put an end to so threatening a symptom. No prudent person, however, would be led to perform so serious an operation as Turning, or the application of the forceps, without being first fully convinced of its necessity. Of the degree and imminency of the danger here, none but a medical person can be supposed a competent judge, and the case must be left in his hands, strengthened, as he should be, by the counsels of a professional brother. I shall feel satisfied, therefore, to have merely referred to this cause, and to leave it to the discretion of the attendant physician, without any additional remarks.

Hernia.—A hernia, especially if of a kind liable to strangulation, might be a warrant for the accoucheur to hasten the moment of relief by the employment of the resources of art. We have also, in a few very rare instances, the dreadful accident of laceration of the womb or vagina to contend with. Of course, as soon as either of these accidents is known to exist, we should resolve to take the management of the delivery into our own hands, in order that we may, at least, save the infant, while we can also offer some faint chances of hope for the safety of the patient.

Hydræmia.—Among the causes of preternatural labor, I ought not to omit a reference to a state of anæmia frequently met with in the progress of pregnancy, and which, when it has attained a certain degree of intensity, is sometimes attended with circumstances of such grave consequence as to render the labor, when it does come on, thoroughly preternatural. The state of pregnancy is, as I have elsewhere remarked, for certain women, not a purely physiological, but an eminently pathological one; and for the most part, the constitutional disturbances in them manifested, are chiefly referable to a state of the hæmatosic power. The woman who develops the uterus and its contents in gravidity, is not unfrequently found to be incapable of supplying the requisite quantity of blood for the ordinary wants of the constitution, and for the extraordinary demands of gestation.

In some of the cases, so great is the destitution of the solid constituent of the blood, which ought to amount to 210, while the watery part should be 790, that the solid portion is reduced perhaps as low as 100, or 150, while the watery element is increased in the same ratio. But, inasmuch as the blood is not only the pabulum of the body, but also its oxygeniferous medium, it is clear that in this state, there is not only a great debility from the failure of supply for the nutritive accretions, but a great derangement in the action of the nervous forces, for want of a thorough supply of oxygen. I am not more thoroughly convinced of any principle in physiology than this, namely, that the stream of nerve force, conducted along the nervous fibrils to the distal points in the organs, is in a ratio with the changes produced in the neurine by the contact and combination with oxygen, brought there by the oxygenated blood.

A perfect blood, viz., blood consisting of 210 solid constituents, and 790 water, is capable of taking out of the respired air in the lungs the amount of oxygen required by the constitution of the individual, greater or less according to the exigencies of it under action or repose, whether physical or psychical. Such a blood can take from the atmosphere any quantity of oxygen required, since the blood, being perfect, is in a fit condition to take up a supply equal to the demand. Such blood is thoroughly and physiologically oxygeniferous;

but if the solid content of the blood be reduced one half, and the aqueous element be increased proportionably, the blood, although still oxygeniferous, is far less oxygeniferous; and, though capable of taking oxygen out of the respired air in the lungs, is incapable of taking a supply equal to the demand. Therefore, when the nervous mass would send down its streams of biotic force to the distal points in the organs, those streams will be feeble, irregular, and incompetent to the perfect manifestations which are required to constitute a healthful play of the said organs. This is the fact with regard to all highly anæmical patients, whose debility is evinced not only in their diminished muscular energy, but also in the imperfectness and irregularity of their sensational, nutritive, and secretory forces. The circulation, the respiration, and the innervation constitute a trinity of forces, mutually dependent, and incapable of existence the one without the other. But in anæmia, the respiration cannot fully do its office of breathing into the blood, which, from its diluteness, cannot become perfectly oxygeniferous. Here is a failure, then, in one side of the triangle. But an imperfect blood gives an imperfect innervation. This is an attack upon another side of the triangle. An imperfect innervation implies incompetent power of the circulation. This is an attack upon the remaining side of the triangle, which is equivalent to saying that, in anæmia, the lungs, the brain, and the heart are cast into a pathological condition, the prime element of mischief consisting in a diminished crasis of the blood,—for "the blood is the fluid body, and the body is the fixed and rigid blood."

Now, a woman, whose lungs, heart, and brain—which constitute, as it were, a triune centre of life—have become disordered by anæmia, goes through her pregnancy with difficulty and hazard, aggravated in proportion to the intensity of the disorders of those prime seats of her life forces. She, in an especial manner, becomes the early subject of those infiltrations of the cellular tissue that are denominated Œdema Gravidarum.

Among the evils of the hydræmic state, one chiefly to be dreaded in the pregnant woman is weakness or flabbiness of the muscular textures that, to a greater or less degree, invariably attends an aggravated anæmia. I do not allude to the weakness and flabbiness of the muscles of relation, nor even to those of digestion, for they might become so without seriously compromising the security of the patient. I allude rather to extreme relaxation and flabbiness of the muscles of the circulation. My clinical experience has presented to me a considerable number of examples of pregnant women, in whom the muscular structure of the heart had become so relaxed by anæmia as to permit the heart itself, in all its cavities, to be greatly augmented in volume—to such a degree, indeed, as to allow its impulse to be perceived over large portions of the thorax. I feel well assured that many instances of this sort are misconceived of by the practitioner as being primary maladies of the heart itself. I have seen them so treated; and have so treated them myself. But multiplied observations have convinced me that the supposed diseases of the heart often prove to be merely anæmical relaxation of its muscular texture, which are perfectly recovered from when the anæmia wholly disappears. During the relaxed condition of the muscular substance of the heart, its walls yield to the lateral pressure of the blood forced into its cavities; and its valves, having their edges too far separated by these dilatations, become incompetent for their offices. They no longer completely prevent the reflux of the blood, or its regurgitation against the current. Hence the loss of rhythm, hence the violent palpitations, hence the accumulation upon the pulmonic side, and hence the inability of the systemic side to carry on the arterial injections to the brain and to the whole constitution. Hence the violent oppression of the respiratory power, and the half asphyxiated condition of the patient whenever she happens to be called upon for extraordinary exertions of muscular force, or extraordinary exercise of perceptive or intellectual power.

The Student ought, in this representation of the state of the anæmical gravid patient, to perceive to what great risks she is exposed of serous effusions into her pericardium at least, if not into the pleuric cavities. She is prone to these effusions already in consequence of her anasarcous condition; and when, to the difficulties arising from a relaxed and dilated heart, a thin, watery, and therefore imperfectly oxygeniferous blood, and all the sequelæ thereupon depending, he supposes the presence of a quantity of serum within the chest, he will obtain a startling view of the dangers of the parturient anæmical patient, and he will be ready to regard the labor which shall terminate such a pregnancy as a preternatural one, even should it not require his aid by the hand or by means of instruments.

CASE.—In 1841, I attended Mrs. S. R. during her first pregnancy. She was about twenty-two years of age—a short, but stoutly made woman. She was about six months gone with child when I was first called to see her, having been recommended to me by a medical friend, who declined to take charge of her case, supposing her to labor under disease of the heart, which rendered her situation extremely precarious. So great was the embarrassment of both the circulation and the respiration, that my esteemed friend had great cause to apprehend she might die in labor, from the exertions she should then be called upon to make. There was already great œdema gravidarum; and slight muscular effort in moving about her apartment served dangerously to augment the respiratory and circulatory embarrassment. I shall cite from my work on *Females*, a notice of this case, which I am desirous to present to the reader of this volume. It may be found there, together with other observations on anæmia in pregnant women, at page 505.

"She presented all the appearances of great dilatation of both the auricles and ventricles of the heart—the impulse of which was perceptible to the right of the middle of the sternum. The pulse, except when she was in a state of recumbent rest, was large, gaseous, unsteady, and very sudden. The face and whole surface were pale and flabby, the cornea nearly uncovered of the upper palpebra. The respiration was troubled, and on the least motion or emotion, precipitate and difficult. At the end of the seventh month, the lower limbs became considerably infiltrated, and the power of muscular motion much curtailed in consequence of its being always attended with violent beating of the heart, breathlessness, and uneasy sensations in the head, as pain, vertigo, noises, and dimness of sight.

"The progress of the pregnancy was accompanied with aggravation of all these appearances.

"On different occasions she had attempted to walk in her house, and had fallen on the floor in a state of insensibility. I, being hurriedly notified of such an accident, arrived on one of the occasions, at the house, soon after she was taken up from the floor and laid upon the bed.

"I found her absolutely pale, scarcely able to speak, and completely blind when I arrived. She knew my voice, and opened her eyes to look at me as I spoke;—the eyes were bright, the pupils natural, but she was wholly without sight. She complained of some degree of fulness of the head. The pulse was still agitated. In a short time the sight returned, and was perfect as before. I do not recollect how many times she actually fell in this manner, and with such following phenomena, but the accident was repeated several times. In nearing the term, the swelling of the limbs from œdema was greatly augmented, so as to affect the thighs, and the buttocks, and labia; the pericardium became also the seat of a dropsical effusion, so that a complete orthopnœa soon declared itself.

"My patient could not lie down day nor night. If she sat up with a pillow against her back and shoulders, the oppression became so dreadful, she was obliged to throw them away; but, requiring some support, she placed her back against one of the posts at the foot of the bed; leaning against the slender cylindrical bedpost, she could find the needful support or rest without the oppression brought on by pillows or cushions. Here she sat day and night for many days, with very bad thin blood, which was imperfectly oxygenated, and so greatly increased the disorders of the innervation. Her condition was truly deplorable, and it was difficult to imagine that the heart could ever recover its form, consistency, and power, should she even escape death in the impending conflict of labor. In fine, labor came on, and in due time I delivered her with the forceps in order to save her from the necessity of exerting any voluntary force."

This young woman is now in the enjoyment of perfect health, having since given birth to several children, without any accident or extraordinary trouble whatever. Nor does she at present labor under any disease of the heart.

Case.—Many years ago, I had charge of the case of Mrs. F. B., who was at that time the mother of two children. She had been in delicate health since the birth of the last one, and came under my care during the last sickness of a medical friend, who had treated her many months as laboring under disease of the heart. To rise from her bed, and take a seat upon the sofa, was sufficient, on many occasions, to develop signs of approaching asphyxia by the disordered circulation consequent upon even the most moderate muscular exertion. I frequently observed the respiration and the heart's action to be so violently disturbed by these moderate efforts as to excite in my mind apprehension of her imminent death. The pulsations of her heart were discoverable far to the right of the sternum, as well as in the left side of her chest. She was deadly pale; her lips swollen and blue; and to lay the expanded palm upon her breast was to discover under it a quaking and a tremulous motion like that perceived upon pressing on a quagmire. After a long treatment, her health amended somewhat. She conceived, and proceeded with doubt and difficulty to the term of her utero-gestation. I very confidently expected she should perish in her approaching labor, during the greater part of which she was obliged to be raised upon pillows on account of a distressing orthopnœa. As the labor drew very nigh its close, it was necessary for her to take a lower recumbent position for the greater convenience of her delivery. I expected constantly, during the progress of her labor, to find her convulsed, and in fact the crisis which was brought about by the last uterine contraction, and the final strong tenesmic effort of expulsion which brought her infant to the light, was instantly followed by a short but most frightful convulsion, which, as it retired, left her apparently moribund. Somehow,—I know not how,—yet by the spontaneous powers of the constitution, she soon revived from this condition, and had no further serious trouble during her lying-in. In fine, this lady recovered a state of robust health. Her vast dilated heart, which seemed to me as large as a quart measure, regained its normal generical magnitude and force, so that, a few years afterwards, she ran before me as light as a girl to the fourth story of the Washington Hotel, without drawing a long breath on reaching the top. Her heart, I feel perfectly assured, was sound and well again.

This was a case of anæmia gravidarum, and the labor was preternatural, for it was orthopnœic, and it was followed by a terrific convulsion. With regard to the treatment of labors rendered preternatural, by aggravated degrees of anæmia, I have only this counsel to give to the Student: 1. That he should clearly disclose to the friends of the patient the whole extent of the perils by which she is surrounded, while he gives to herself the reasonable assurances of his hope to conduct her safely through the whole course of her labor. 2. That, in the Conduct of the case, he should take all possible precautions to avoid undue excitement of the nervous and vascular systems, forbidding the bystanders to exhort her to bear down, and frequently advising her to bear her pains patiently, waiting for their dilating effects, and so continuing until the presenting part, having come within reach of the hand or the forceps, may be gently drawn away almost without any spontaneous assistance of her own. If there can be found a case in which the power of the forceps can be deemed more beneficent than in another case, it is that in which a parturient woman, with an immensely dilated heart, disparted valves, with cellular infiltration, and serous effusions within the chest, has barely power to live, but not enough both to live and expel the child from the womb.

Perhaps it may not be inapposite, in this place, to say that precautions should be taken, during the progress of the pregnancy, whereby to obviate these awful conditions of the pregnant woman at full term. It is true that the woman may be greatly infiltrated in pregnancy without having a dilated heart, and that such infiltrations readily disappear after the birth of the child; but they almost never disappear without leaving the patient pale and chlorotic—or, in other words, hydræmic. I shall think that the woman excessively affected with œdema gravidarum should always be held to be threatened with relaxation or flabbiness of the muscular fibres of the heart, and the thereupon dependent disorders of which I have spoken. In order to overcome the œdema, it might in some cases be necessary, and no doubt is often effectual, to draw blood from the arm, to regulate the diet carefully, to entertain a soluble state of the bowels, and more than all these, to command the patient for a week, or more than a fortnight even, to take an unintermitted horizontal rest upon her bed or couch. To rest for a long time, and in doing so to avoid the dorsal decubitus as much as possible, is to put a stop to the progress of the infiltrating secretion, which I believe in true œdema gravidarum always begins and ends in the most dependent parts—to wit, the feet and legs. The circulation in such a posture becomes more and more moderate, and the aqueous humor already effused, being now dispersed almost over the whole of the subcutaneous cellular tela, is imbibed by thousands of absorbing orifices, to whose action it could never be exposed while accumulated solely in the lower part of the trunk and in the inferior extremities. I confidently recommend this mode of treatment, and I assure the Student that I saw a young lady, a primipara, who in October, 1848, was five months past gone with child, in whom the œdema gravidarum had distended not the legs only, but very much also the pudenda; in whom the whole of the dropsical effusion disappeared in some ten days of a horizontal recumbency which she observed in consequence of my recommendation. These dropsical effusions should not be regarded by the Student as always the signs of an hydropic diathesis, but rather, as I have elsewhere explained, as the results of mechanical pressure and obstructions upon veins and absorbent trunks. Where the œdema has become very great, and the anæmical condition aggravated, there arises a real hydropic tendency or diathesis which leads to effusions into the belly or into the chest. As to the advice to draw, on certain occasions, blood from the arm of the hydræmic patient, I do not find I am inconsistent with myself. It is to be remembered that the hydræmia is in this case produced by a pathological state of the hæmatosic tissues, and that to bleed is, in some cases, to cure that malady.

Common experience and observation show very clearly the propriety there is, in all those cases where the anæmia has become thoroughly established or well set in, to prescribe for the patient the use of ferruginous tonics. It is scarcely necessary for me to repeat, in this place, that the article most suitable for the occasion is the metallic iron of M. Quevenne. It may be given in doses of two grains in the form of a pill, to be taken immediately after meals three times a day.

Exhaustion.—Labors are rendered preternatural by the occurrence of what is called Exhaustion. The causes of exhaustion are numerous. Any disproportion between the child to be born, and the straits or the excavation of the pelvis, might, by protracting the vain efforts of the woman, serve to exhaust her forces. This disproportion may be absolute or relative. The child may be preternaturally large, to that degree indeed as to make it impossible, or nearly impossible, for it to pass, unreduced in magnitude, through the parts of the female. Or the child may be of the normal size, while the pelvis is of under size, though in other respects well fashioned. Again, both the child and the pelvis may be duly proportioned to each other; yet the child may so present itself to the passages, as to retard or render impossible its exclusion without extrinsical aid. Thus the child may present its head in extension at the superior strait, and descend in face presentation, with its chin to the sacrum and its forehead to the front of the pelvis; and it would prove a very extraordinary circumstance should the woman fail to fall into the state of Exhaustion, unless delivered by the hands of the accoucheur: or there might be in the labor, a departure of the chin from the breast; or there might be such an occipito-posterior position of the head as to cause the two extremities of the occipito-frontal diameter to become immovably fixed upon opposite surfaces of the pelvis, constituting what is called arrest, and ultimately impaction, of the cranium of the fœtus. An unturned or unevolved shoulder presentation; or a prolapsion of a hand or a foot along with the head; or the impaction of the parts of two children at the same time in the pelvis, might serve to exhaust the expulsive as well as the vital powers of the woman. In addition to the above causes of this kind of preternatural labor, we ought not to omit to mention rigidity of the vaginal cervix, whether simple rigidity, or whether rigidity arising from carcinoma, or the remains of uncured inflammation of the os uteri. In addition to these causes, the action of the womb may be contravened by a rheumatical state of the organ, or by the intrusion of a loop of intestine betwixt the front aspect of the womb and the contracting abdominal muscles, occasioning, during the labor throe, such great pain in the prolapsed loop of intestine, by compressing it between the hardened globe of the uterus and the contracting abdominal muscles, as to destroy the complacency of the constitution, and overcome the proper conformableness of the innervations *ad partum*. It is scarcely necessary for me to enumerate, in this connection, all the possible causes of exhaustion in labor; it is better that I should say to the Student that the parturient action of the uterus and accessory muscles is effected at a certain expense of power developed in the nervous mass of the patient, and that while a woman in ordinary labor, and even in very severe and long-protracted labor, is generally found to be capable of evolving from her nervous mass, and of sending down to the uterus and adjuvant muscles, an amount of innervative force sufficient to enable them to overcome all obstacles to the birth of the child, yet these obstacles are in some instances so rebellious, and so inexpugnable, that the sources of the nerve streams become utterly exhausted, and the cerebro-spinal axis refuses any longer to repeat vain attempts to deliver; the woman lying motionless, feeble, and in a state which, to be truly denominated, should be called exhaustion, or the commencement of the moribund state.

Let the Student consider a little the condition of the parturient woman as above represented. He will see that she has long suffered the extremest sensitive distress or pain; that her heart, and lungs, and brain have co-operated in vain for the effectuation of her deliverance; that the lungs have breathed at a greatly increased rate upon the blood, to charge it more abundantly with oxygen; that the heart's action has been enormously augmented in frequency and force, in order to hurry this oxygeniferous blood to the brain; that the brain, combining with its oxygen, has evolved and sent down to the struggling organs and to the whole constitution, torrents of nervous force, so that not they only, but the whole constitution, have been actuated to the highest possible strain of their life-forces. Let the Student conceive that this force-production, and this actuation under its stimulations, must come to a certain end, and that in doing so there will be found not disorders only, and feebleness and anæsthesia of the living solids of the body, but disastrous changes in the crasis, mixt, or constitution of the blood. And herein he will see a representation of the state of the woman lying in exhaustion after vain attempts to deliver herself in a protracted labor. The heart has lost its force and increased its frequency, for the sources of its innervation are greatly diminished, and its own physical structure has become changed in impressionability and power. The respiration is hurried and short, for the diaphragm, the respiratory piston, makes short strokes frequently repeated—its power being nearly done. These states of the respiration and circulation necessarily involve disordered and diminished evolution of life-force in the nervous mass, and the blood, the fluid body, becomes fatally changed. Let the Student take heed, therefore, of the beginnings of exhaustion, for she who has gone far into it is irrecoverably gone into it. It is exigent to deliver her, and that in the manner least likely to consume her feeble remains of life power. Exhaustion is preternatural in labor, and even if it were not so, the duty becomes incumbent on him to render the labor preternatural by delivering with the vectis, the forceps, or the embryotomy forceps. Let him bring the chin to the front of the pelvis; or let him use the vectis; or let him reduce its magnitude with the perforator, in order that the child may be born; or let him extract it with the forceps. Let him, where there is departure of the chin and consequent impaction, restore the chin to the breast, or convert it altogether into a face presentation; let him convert the occipito-posterior into an occipito-anterior position; let him return the prolapsed arm above the head; let him put away the foot, and give space for the head to descend through the pelvis; let him turn and deliver by the feet, or promote the spontaneous evolution of the fœtus; let him disengage the prolapsed loop of intestine from betwixt the womb and abdominal muscles; let him reduce the size of the hydrencephalic head of the fœtus, in order that it may pass the straits; let him take away from the woman any further necessity to evolve biotic force for the expelling womb and abdomen; let him take away from her agonized nervous mass all further occasion to perceive the irritation, the pressure, or the pain; and then, tenderly placing her upon her pillows, wait until perchance her blood may be redeemed from its perilous disorders, and her neurine again come to send down its streams of biotic power to all her organs and organisms, with a gently increasing, conformable, and normal intensity. There is a great difference between exhaustion and the mere cessation or suspension of labor pains. The woman may fall into labor, and after proceeding many hours towards the accomplishment of her delivery, she may stop for many hours to commence again, and again to cease, the work of expulsion. The act of labor being established, does not necessarily imply that the effort shall be continued until the completion of the process. A woman may be in labor during several hours daily for a whole month, dilating her os uteri to the size of a half dollar, and then closing it again so that it shall become as small as before the commencement of the process; so a woman, even in advanced labor, may cease to labor for hours, or for many days, and yet suffer no perceptible illness. Such a case is not sickness. It is not exhaustion. Hence, I warn the Student that he ought not to commit the serious mistake of concluding, merely from the cessation of the pains, that the woman is in a state of exhaustion, or even beginning to fall into that dangerous state. I know not why it happens, as it often does happen, that labors begin and stop without any apparent indisposition; but I know that the records of a man's practice should furnish him with many instances of the kind.

To know the state of real exhaustion, let him look upon the condition of the vital triad—the brain, heart, and lungs; or, in other words, the innervative, the circulatory, and the oxygenating functions. He will discover the condition of the brain by the psychical signs, such as illusions, hallucinations, delirium, altered temper; and by the physical signs, loss of co-ordinating power in the cerebellum, seeing power in the quadrigeminal tubercles, respiratory power in the indispensable respiratory bulb, and lessened intensity of the nervous force in general. The embarrassment of the circulation is discoverable by lessened power of systemic injection, and augmentation of the frequency of it—the oxygenation shows its failure by change of temperature, and of colorific power, all of which must be studied and profoundly studied and understood in the manifest action of the mind and the whole physical conduct and aspect of the patient. In a difficult labor tending to exhaustion, there will first be discoverable a most marked violence in the effort of the arterial pulse, which becomes voluminous, hard, and frequent—beating about 110 pulses per minute. Whenever, after some time of protracted and fatiguing efforts with such a state of the pulse, the contractions of the heart are found to be repeated 120 to 140 times a minute, the volume of the artery becoming reduced, the temperature being also lessened, with a dry mouth and parching thirst, loss of courage and resolution on the part of the poor woman, the presenting part in the mean time making no progress whatever, exhaustion has begun, and has already proceeded even too far.

Exhaustion is not likely to arise from the resistance of the soft tissues only. Even the most rigid cervix uteri gives way when the strength begins to go down. So also the most resisting perineum yields before the constitutional force is abolished or overthrown. But the impacted head, the unturned shoulder, or the impracticable pelvis, can never give way; and the efforts of the nervous, circulatory, and oxygenating forces must ever fail in presence of inexpugnable resistance: in such instances, the sources of the innervation must, sooner or later, become wholly exhausted, and the woman be lost if she be left to the powers of her own constitution.

In the beginning of exhaustion, to deliver is to save the mother. A too long procrastination of her deliverance is most apt to insure her death.

Exhaustion not being likely to ensue in consequence of soft resistance only, we have, even in the most obstinate cases of soft resistance, little to fear from contusion and a coincident irritation or shock; nor have we ground to look for dangerous sloughings at a later period. But when exhaustion arises from vain attempts to overcome the resistance of solid bone, we have, in addition to the direct effect of such efforts in vitiating the blood and modifying the crasis of the nervous mass, much mischievous impression upon the whole nervous system, radiating from parts engorged, contused, or ruptured. The violent excitement of the sanguiferous system, in painful protracted labors, serves in a sense to demolish the organization of the blood, which becomes broken down, its plastic portion being increased excessively, while it loses in a measure its sensibility to the action of oxygen; it loses, in other words, its healthy crasis, and the innervative results of its oxygeniferous force and its contaction with the nervous mass become unconformable to the wants of the organs, which fail and die under such want.

Engagement of a Loop of Intestine in front of the Womb.— The gravid uterus, at full term, lies behind the abdominal integuments, and quite in front of the mass of intestinal convolutions and transverse colon and its sigma. It sometimes happens that a portion of the mesentery or mesocolon, I know not which, becomes so relaxed or elongated in the direction of its radius, as to permit a considerable portion of the intestinal tube to fall over the front aspect of the womb, and, when once engaged there, to be driven down by the expulsive force of the belly, as low as, or even lower than the umbilicus, where it is pinched, or compressed, or perhaps in a sense strangulated, by the contraction of the abdominal muscles in the labor throes. The Student will readily conclude that so distressed a condition of an important organ could not but introduce modifications in a labor. In such a case, his attention will be drawn to the extreme suffering of his patient during her pains, which, instead of propelling the child rapidly, as might be expected in view of the intenseness of her distress, cause it not to advance even one tittle; while cries, jactitation, and the most disheartening expressions leave him at a loss to imagine the cause of delay, the more particularly when he finds not, in the position, the presentation, or the state of the soft parts, causes that might arrest the progress of the parturition. He ought to inquire as to the existence of such possible causes. If he find them not by his vaginal exploration, let him ask questions as to the place and kind of pain, and he will discover that the woman has intestinal pain, and that that pain is situated between the womb and the integument.

Case.—Without making further special observations on this accident, it will suffice me here to say that, about four years since, I was in attendance upon a primipara lady occupying a high social rank in this city; that the labor had proceeded without any untoward circumstance to an almost complete dilatation of the cervix uteri, when my patient began suddenly to complain most unaccountably of her pains. She became excessively agitated, and being a person possessed of great self-control, I was astonished and much alarmed by her moans and agitation. I could discover in the condition of the presenting parts, or the textures within the pelvis, no just grounds of so great a distress; but after careful inquiry, learned that the pain was in the uterine tumor, just above the umbilicus. She had not been affected with rheumatismus uteri during her gestation or the antecedent part of her labor; I was obliged, therefore, to fall back upon the painful apprehension that the texture of the uterus was about to give way at the seat of this pain, for that is what the practitioner ought to apprehend under such circumstances. Approaching the lady's bedside, I requested permission to examine the abdomen by palpation, for which the nurse prepared her by uncovering her of all save the under garment. Upon touching the abdomen, I found an irregular eminence in the place complained of. Gently percussing it, I discovered from its sonorousness that it was a considerable loop of intestine fallen down there, and which, being compressed between every uterine and abdominal contraction, had given rise to the agitation and pain. As the integuments were thin, I was enabled by a sort of taxis to push the loop upwards from its dangerous position, whereupon the labor pains became again normal, and the parturition thenceforth proceeded steadily and towardly to a happy conclusion. I have never met with a similar example. This was altogether an unnatural state for a woman in labor, and therefore I consider this woman's labor altogether a preternatural one. I thought it best to make this relation of the case, which, should such a one occur to an inexperienced practitioner, might cause him to regret that he had not been forearmed by thus being forewarned. I venture to remark, that the interruption to the progress of the paturient efforts here ought to be assigned to the same category of influences as those already mentioned by me at page 328, as depending on the fall of a portion of intestine below the head in labor.

Carcinoma Uteri.—Carcinomatous degeneration of the cervix and os uteri does not, unhappily, always obviate the power of fecundation and conception. A lip of the os tincæ may be even far gone into carcinomatous degeneration without exciting suspicious discharges of mucus, sanies, or of blood, and even without developing such a degree of sensibility of the part as to preclude the consent of the female to cohabitation. The development of heterologue tissue in the cervix uteri is, in some instances, as slow and torpid as the development of similar tumors in the breast and other parts of the body. To become pregnant under such circumstances is a great misfortune indeed, for gestation changes the whole life-activity of the uterus, which becomes greatly exaggerated in force and intensity, which is altered in form and density, and fatally tends, *pari passû*, to the augmentation of the heterologue life which has established itself upon the vaginal portion of the organ. Hence, the torpid and sleepy carcinoma takes upon it the more ferine life of the open cancer, and when the fœtus, if ever, has attained its full growth, and the labor has begun, let the Student imagine the awful condition of the patient, one-half of the circumference of whose cervix uteri has become a mass of heterologue tissue, filled with the caudate cells and the silvery bands of the cancerous mass, utterly unsusceptible of dilatation, almost frangible from its solidity, and exquisitely sore and painful. If such a womb should ever be opened, the dilatation of the mouth of it must be effected at the expense of the unaffected half of it, which is its only dilatable portion. If the circle of the os uteri must in labor become a circle of twelve or thirteen inches in circumference, in order to permit the escape of the head, what must be the unspeakable agony of the patient, half the circumference of whose os uteri has become perfectly undilatable through carcinomatous degeneration?

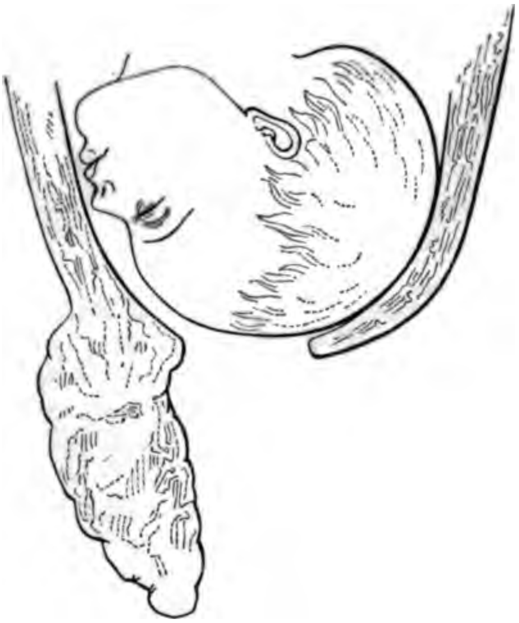
Case.—I saw, in the early part of the year 1847, a wretched human being, whose cervix uteri and vagina, the seat of a frightful ulcerated carcinoma, had just been torn to pieces by the escape of a full-sized fœtus at term.

Case.—On the 18th of March, 1848, I was called at 11 P.M. in consultation, to a pregnant lady. She was thirty-three years of age. She has not had a child during the last fourteen years, having previously given birth, I believe, to two children.

Throughout the whole course of the present gestation, she has suffered with distressing, most distressing, nausea and vomiting. She is pale and emaciated. Has had frequent bloody vaginal discharges from the beginning of the pregnancy until now—expects her accouchement about the tenth proximo.

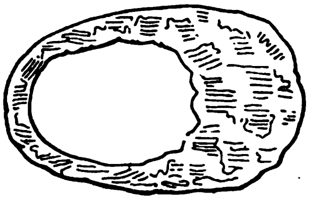
At six P. M. she was attacked with flooding, since which time she has lost probably more than eight ounces of blood, which still continues to ooze slowly away. They showed me a hard vaginal coagulum, larger than the whole thumb. Figure 95 annexed, represents the size of the os uteri and the thickness of its edges: the posterior lip, which is much thicker than the remainder of the circle, is seen on the left side of the plan; this lip is prolonged into a tumor that bleeds at the slightest touch, and is evidently a mass of carcinomatous tissue in open ulceration. The figure, half size of nature, gives a correct notion of the profile of this tumor, and of the degree of the aperture of the os uteri, in which the child's head is represented as pressing upon the cervix and

Fig. 95.



os. The tumor is seen in profile descending into the vagina. Figure 96 gives a front view of it. The tumor is hard, wholly undilatable, so that the whole of the dilatation hitherto effected, has been effected at the expense of three-fifths of the circle, the remaining heterologue two-fifths not having furnished anything to the dilatation, or, if anything, an uncomputable proportion.

Fig. 96.

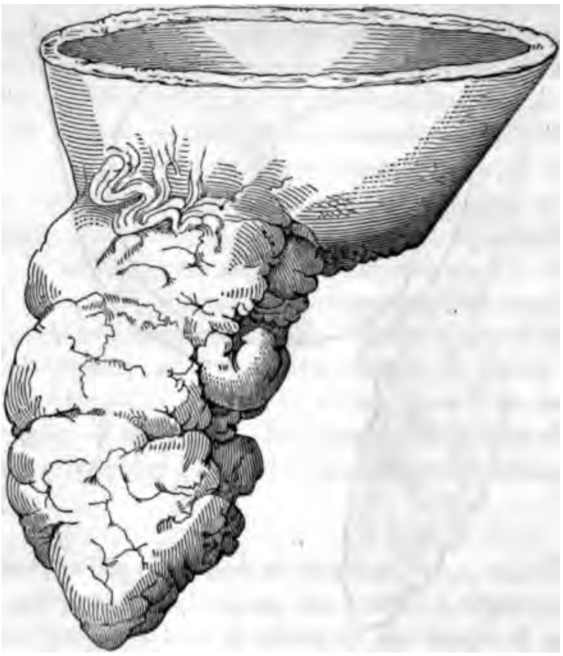


Agreeably to the decision in consultation, she got an enema of forty-five drops of laudanum mixed in a fluid-ounce of clear starch.

March 19th, 12 M. She slept well after the enema, and has had no pain to-day.

21st. Has continued well up to 3 P. M. to-day, when she was seized with the pains of labor, attended with inconsiderable hemorrhage. I was again summoned to the consultation at 5½ P. M. The os uteri was dilating. The tumor was now found nearer to the left ischium, as if

Fig. 97.



the womb had been rolled upon its axis. As the pains increased, her distress became very great indeed,—I may say unspeakably great. The child had attained to within twenty days of term, and it was apparent that full two-fifths and more of the cone of the cervix uteri could not furnish any material for the necessary dilatation. Hence there must be the greatest danger of rupturing the tissue, and accordingly, at six o'clock in the afternoon, the whole projecting mass of the tumor came away into the hand of the gentleman in attendance, who handed it to me, and of which a good representation is given in Figure 97.

The lady was a person of admirable temper and manners, but the greatest courage and the utmost stretch of her Christian fortitude and patience could not conceal from the anxious spectators the extremity of her agony.

There was no great increase of hemorrhage after the separation and escape of the tumor, but the bag of waters was thrust down far outside of the ostium vaginæ, soon after which, at 6½ P. M., the child was expelled. A solution of morphia was administered to her, and she became composed. At one o'clock in the morning, she was seized with a rigor, which soon became a violent ague that lasted more than an hour, whereupon febrile reaction ensued, with a pulse at 180 beats per minute. This febrile condition was attended with violent pain and intense sensibility of the abdomen to pressure. There had been very little discharge since the expulsion of the child, and the mass of the uterus was well and firmly contracted. Upon the establishment of the febrile reaction, she was bled to the amount of twenty-two ounces, with great relief to her distress, and without the least appearance of syncope.

Wednesday, March 22d. At one o'clock to-day she suddenly began to sink. She was in the full possession of her intellectual powers, and had not the slightest pain. She died in the afternoon. Upon examining the body, about twenty-four hours after death, there was no trace of hemorrhage in the belly, nor any marks of peritonitis. These figures were drawn by Mr. Gihon, and represent the tumor correctly.

I have met with some examples of carcinoma of the cervix in pregnancy which did not prevent the patients from recovering from the lying-in; but I lately saw a woman who was delivered while affected with carcinoma of the cervix and vagina. The parts gave way, and she died.

Smallpox.—There can scarcely be a more disturbing cause of a parturition than smallpox existing in the system of a woman in labor; not because it modifies the presentation or position of the child, nor because it dangerously interferes with the action of those dynamical properties by means of which the product of the conception is discharged from the womb. A labor, or, to speak more definitely, a perfectly normal parturient act, in itself not necessarily dangerous, nor fatal, may have a mortal result, because the woman who has been confined cannot be said to have completed the act of lying-in, as relative to herself at least, until she shall have recovered a healthful non-gravid condition. I think it is right, therefore, to regard as a preternatural labor any one which from some complication, whether of disease or accident, exposes the mother after delivery to the most imminent danger of death.

I will not say that every woman who gives birth to a child while laboring under smallpox must inevitably perish, since my clinical experience has shown me that the contrary may, rarely, be the case. But I do hold to the opinion, that a pregnant woman laboring under a considerable attack of smallpox is far more likely to be lost than saved, whether she miscarries, whether she be prematurely confined, or whether she give birth to her child at the full term of utero-gestation. A pregnant woman may be attacked with smallpox even in its most direful confluent form, and yet recover well, provided labor does not come on in the course of the disease; but, if she be confined or suffer abortion, she shall hardly escape death by hemorrhage from the womb, or by metro-phlebitis coming on early after the detachment and expulsion of the placenta.

Late authors on obstetrics have expressed the opinion that the bleeding orifices upon the inner aspect of the womb—those, to wit, which give issue to the lochia—cannot be restored to a non-gravid health save by the intervention of an adhesive inflammation of those vessels. That adhesive inflammation is phlebitis, how little soever it may be. And they further express the opinion that the milk-fever of women, and the same milk-fever which is known to affect our domestic quadrupeds after their parturition, is the constitutional disorder developed by the purely topical and limited phlebitis affecting the uterine orifices above mentioned. This opinion appears to me to be worthy of respect, upon a simple annunciation of it, as well as from the confidence to be reposed in the judgment of the authors in question.

If, now, the Student will consider for a moment the nature of that direful malady of which we are speaking—the smallpox—and reflect upon its unquestioned power to modify the crasis of the blood, he will feel no surprise to observe, as he will in future have melancholy opportunities to do, the tendency of the variolous poison either to set on foot, or to aggravate any necessary or normal phlebitic affection to which the parturient female is liable; nor will he feel any greater degree of surprise to find that the modified blood of the variolous patient continues to ooze from the parietes even of a well-contracted uterus after delivery, and that his hæmostatic agents are all alike futile in opposition to the tendency of the vessels to allow of protracted and ultimately fatal losses of the vital fluid.

My principal design in introducing this section here is, in the first place, to point out the great necessity there is for pregnant women scrupulously to avoid the contagion of variola; for I think I am quite correct in stating that the sentiment of the profession is almost unanimous, that the woman who is confined during smallpox, dies. This is the general rule. The exceptions are here and there a few cases, in which she escapes as by miracle. I must take the liberty to reiterate my opinion that she dies either from the ooze, or from phlebitis, which is essentially endangitis. I could have no design, in this place, to set forth any precepts in regard to the Conduct of labor, in a woman suffering under smallpox. I have already said that that malady is not to be supposed to modify either the presentation, the position, or the dynamics of any labor.

Now let the Student beware not to expose his gravid patient to the least danger of variolous infection; and, therefore, let him never venture, under any circumstances, to vaccinate a pregnant woman, or one recently confined. To give this precept is the essential motive I had for introducing this article into my work, and I am the more desirous to attract the attention of the Student to this point, because I know that the brethren in general are not in the least suspicious, that to vaccinate a pregnant woman is to expose her to great hazard. I reiterate the assertion that the virus of smallpox is eminently inimical to the life of the pregnant female, and I aver that the virus of the vaccine inoculation is little less so than that of unmitigated smallpox.

If the Student will take two clean lancets, and plunge the points of them into a mature smallpox pustule, he may send one of them a hundred leagues eastward, and with it inoculate an unprotected individual, who will receive from it the infection of unmodified variola; and consecutive inoculation from this line would repeat variola for centuries. Let him send the other lancet a hundred leagues westward, and with it inoculate the udder of a healthy cow. He will in this way communicate to the animal a vaccine infection, from which vaccine inoculations of human beings may be consecutively repeated for centuries. So that the variolous pustule in the human being has communicated the vaccine infection to the cow, which vaccine infection may likewise be repeated, without modifying it further, through an unknown series of human bodies. The generical force of the inferior animal has modified a poison produced by the generical force of the human being. It has changed it, not destroyed it. It retains a portion of its variolous power inimical to the pregnant woman, and to expose such an one to its rage is a gross imprudence and misapprehension which I hope no Student reading this book will ever be guilty of. The shocking spectacles of distress that I have witnessed, from the vaccination of pregnant females, have so impressed my mind with the enormity of the imprudence, that nothing, I think, could tempt me to commit it myself. The most furious phlebitis, which is endangitis, and which, in other words, becomes pyæmic fever, is one of the consequences likely to result from every true or spurious vaccination of a pregnant female. I am firmly convinced that it is far better for the physician, during the epidemic of smallpox, to leave his pregnant patient to the chance of a natural infection, than certainly to bring her within the scope of its virulent power by a vaccine inoculation, which is but a variolous inoculation modified by the generical force of an inferior zoological genus.

If I venture to put forth such opinions as the above, it is hardly incumbent upon me further to protest against the temerity of those who, during the existence of a smallpox epidemic, recommend, and even proffer, what is called revaccination, to those who, having been already vaccinated, might be held to be protected; I mean, to pregnant women. I have seen pregnant women, very nigh to term, unnecessarily revaccinated, with consequences so terrific that I think I would not, for a thousand golden crowns, either vaccinate or revaccinate any woman knowing her to be pregnant.

Scarlatina.—A woman who should have the misfortune to be seized with scarlet fever, and to be brought to bed while affected with it, would be more apt to die than to recover. Dr. Dewees used to say: "The woman who has scarlatina in her Lying-in, dies." This, though true in general, presents exceptional cases. I have had four such cases, in which all the patients recovered, to my great surprise and pleasure. In my work on *Children*, I gave, in the article on Scarlatina, my views as to the nature of that malady. If, as I there suppose, scarlatina is essentially an inflammation of the vasa vasorum, and derm-capillaries, we need not be surprised at the tendency of it in women newly delivered, to result in pyæmic or other forms of the puerperal fever.

Twins and Triplets.—In Churchill's *System of Midwifery*, Phila. ed. 1846, p. 411, there are statistical statements on the subject of twin and triplet pregnancies. Dr. Churchill states that out of 448,998 cases of pregnancy, we have 5,776 cases of twins, or one in 77¾, and 77 cases of triplets, or one in 5,831 cases. A case that occurs only once in 77 labors, and in the course of some men's practice not so frequently, will be esteemed to be preternatural; for that is natural which occurs constantly, that is more nearly natural which occurs frequently, and that is preternatural which occurs very rarely. A triplet labor, which, according to Dr. Churchill, occurs only once in 5,881 cases, will certainly be admitted to be an unnatural labor, or, to use a technical phrase, a preternatural labor. I shall not err, then, in setting down twin and triplet cases as cases of preternatural labor; at least, I find it more convenient to arrange them here than to give a separate chapter on the subject.

As a general rule, a twin labor is not suspected to be so until after the birth of the first child, for a woman carrying twins in the womb is found frequently not to be larger than she who carries but a single one. Two children of six pounds' weight each do not weigh so much as a single child of twelve pounds and a half, and the liquor amnii of the double pregnancy may be far less in quantity than the liquor amnii of a unipara womb. If a woman in the latter weeks of her pregnancy should become very lusty, as it is called, or if the abdominal walls, becoming weakened, allow the uterus to fall far forward, so as to make the belly a little pendulous, that circumstance may give rise to misapprehension, and the woman is apt to fear that she will be so unfortunate as to give birth to twins. In practice, the Student will find that ten women shall fear twin labor, for one that shall really suffer it; and that in ten twin labors, there shall be only three or four in which twins shall be suspected to exist. It is not difficult in the pregnancy to ascertain the existence of twins, since the use of the stethoscope serves to reveal the pulsations of two distinct hearts, and, moreover, during the flaccid state of a womb, if a woman lie upon the back, the feet drawn up, it is not difficult by external palpation to detect the existence of two distinct, orbicular, hard heads.

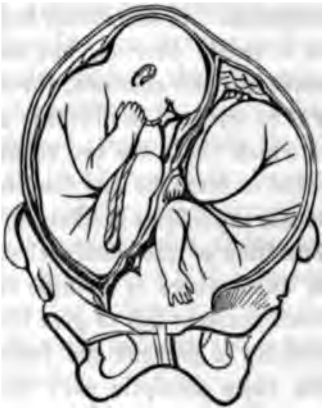
Although I prefer to speak of twin and triplet labors in the chapter upon preternatural labors, I am ready to admit that many women giving birth to twins, find themselves delivered promptly and with little pain, especially when the children, as is usually the case, are under size; nevertheless, in twin labors with large children—and I have seen two children the sum of whose weights was sixteen pounds and a half, and where the ova contained a very extraordinary amount of liquor amnii—the process of parturition is exceedingly slow, disheartening, and painful. The overloaded uterus acts feebly and irregularly; the labor is long in establishing itself, the excessive extension of the muscular tissue of the uterus prevents the organ from propelling the point of the ovum into the cervix and through the orifice of the os; the bag of waters is therefore slow in being formed.

It rarely happens that the waters of both the ova come off together. If the amniotic sac which contains the first child or the presenting child should have discharged its fluid contents, then the expulsive power of the uterus must be communicated to the advancing child through the unbroken ovum of the second birth; such an elastic and compressible medium for the communication of the expulsive force must frequently have the effect of decomposing it, and rendering futile the exertion of it. If the membranes of the first child remain whole, and those of the second child be first broken and discharged, as sometimes happens, the same effect is produced. I have seen a twin labor in which the first child pushed the placenta of its brother before it into the world.

In case both ova are ruptured, the lowermost child must be thrust down by the uppermost child; but, as the uppermost child is never directly above the lowermost, its force must be communicated laterally. It acts obliquely upon the body of its mate; and the practitioner who finds an os uteri ductile and not reluctant, is ordinarily embarrassed to make up his opinion as to the cause of the slowness of the labor, whose slowness seems inexplicable, since where the resistance is small and the woman in good health, he expects the advance to take place at a certain usual rate. He might be tempted on this account to exhibit the ergot, or administer stimulants, or exhibit some provocative to increased uterine action. He ought to do no such thing; the duty of an accoucheur is to inquire into the cause of the slowness. Let him rise from his seat and apply his ear to the abdomen of the woman; if he finds the fœtal heart, let him ascertain its place, as relative to the top of the symphysis pubis, nearer or more remote from it in the hypogastrium; and knowing where the head is, then, with his hand upon the abdominal uterine tumor, he will at once come to the conclusion that the womb contains one child, or more than one child. In the latter case, let him find the heart of the second child, and the position of that heart will afford him a tolerably good diagnostic as to the presentation of the second twin, as offering either a cephalic or a pelvic presentation. If the accoucheur then finds that the uterus is overloaded, and that it is acting at a great disadvantage in consequence of its being compelled to communicate its expulsive force through the body of the first child obliquely to that of the advancing twin, he will understand his case, and act accordingly.

In twin labors, the children present both by the head, or one by the head and the other by the breech, as in Figure 98.

Fig. 98.



In case the children present both by the head, there is risk that when the first head shall have fairly sunk below the plane of the superior strait, the other head may, by the expulsive action of the womb, be thrust downwards near the superior strait against the throat of the first child, which it crushes against the opposing wall of the pelvis, and thus locks the lower head, which cannot descend because the thorax to which it is attached cannot enter the brim, on account of the presence there of the second head. Let the Student imagine the difficulty of treating such a case, for the first head fills the cavity in such a way as to prevent his passing his hand up, and he well knows that when the fœtal head is fairly within the excavation, it is an extraordinarily difficult and often impossible thing to thrust it again above the superior strait, in order to turn and deliver. I am happy to say that my clinical experience has never furnished me with an example of this sort. A case of the kind occurred to one of my brethren here a few years since, which embarrassed him greatly; he could neither return the first head nor displace the second; he took the measure, therefore, of decapitating the lowermost child, and, after its head was removed, the second child was delivered, and the headless trunk of the first one followed it.

In case the first child should present by the breech and descend through the pelvis, there is always great reason to fear that the second child, presenting by the head, might have its head urged down faster than the head of the breechling; if it should be jammed into the pelvis along-side the throat before the other head can get possession of it, it would present another example of the process in which one head is keyed by another. There is less danger in this case than in the former, because the trunk of the child would not form an insuperable obstacle to the passage of a hand, whereby to displace the keying head.

It has happened to me, on different occasions, to find the woman becoming so much fatigued, so much worn out, indeed, by the protracted efforts of a twin labor, that I felt obliged at the last to give the assistance of my forceps, both for the first and second child.

A labor with twins is one in which there may be either one or two placentæ. It sometimes happens that both the children are contained in a single chorion, but each child must have its own amnion; if there are two chorions, there will be two placentæ, and these placentæ will be situated in different and opposite parts of the uterus. A labor in which there are two separate placentæ, and in which the first placenta is detached and discharged with the child, is one in which the placental superficies is likely to bleed, for there cannot be immediate condensation of the placental superficies of such a womb. A twin labor, in which there is a single chorion and a single amnion, is one which could scarcely fail to give birth to a specimen in teratology, for there is nothing to prevent the fusion of the parts of twins contained within the same amniotic sac: whereas such fusion of parts is impossible in two separate amnia. Chang and Eng must have existed in a single amnion: so did Ritâ Christina. The same must have been the case with Dr. Pfeiffer's double-headed infant, to which I refer the Student; and with my specimen of the omphalodyme, contained in the museum of Jefferson Medical College.

One never has charge of a twin labor without feeling some anxiety with regard to the hemorrhage likely to follow the birth of the first child, and the accoucheur should not dare to leave the woman until she be safely delivered of the second. As a general rule, the same contractility of the uterus which expels the first child, after a slight pause, resumes its operation for the expulsion of the second, just as happens as to the expulsion of the after-birth in a unipara labor: and we may therefore expect that within the hour the presenting part of the second child shall descend through the os uteri into the vagina. I think I have never waited so long as an hour. When the membranes have already been ruptured, I have found the child to descend earlier than that, and when they had not already given way, I have ruptured the ovum within twenty minutes. As my own experience in this particular has been fortunate, I venture, upon that ground, to advise the medical Student to follow the same course. Some persons prefer to wait for a longer time, and I admit, if the patient be carefully observed, if there be no signs of hemorrhage or faintness or other exigent motive for interfering, one might feel himself justified in waiting for a longer time than that I have indicated. Let him always make the diagnosis as to the presentation before he proceeds to rupture the ovum, and should he find a cross birth, a possible event, let him hasten to pass his hand high up on the side of the ovum, penetrate it there, and seize the feet in order to turn and deliver.

In these cases there ought to be a good light on the patient's face, for the hemorrhage is sometimes astounding, and the earliest indications of it may, on certain occasions, be detected in the expression and tint of the countenance. Whenever hemorrhage is suspected to have begun, or is known to have commenced, there should be no hesitation in rupturing the membranes; the discharge of the second sac fulfils Louise Bourgeois's commandment, to let the water off in order that the womb may condense itself. The accoucheur, under such circumstances, would act according to the indication; if the hemorrhage is sudden and startling, he would turn and deliver, provided the head is above the superior strait; he would seize and extract it with the forceps, provided it were in the excavation.

As soon as the second child is born, pressure should be made upon the hypogastrium to promote a tonic contraction of the uterus; the lately over-distended, but now relaxed belly, should be sustained by a proper binder and compress, and the placenta or placentas should be carefully extracted.

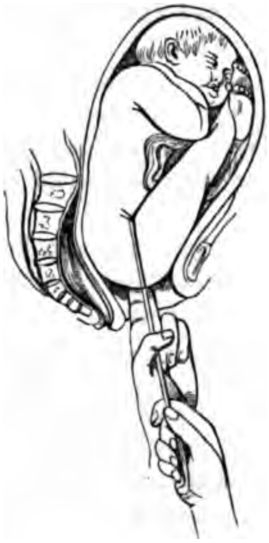
In triplet labors the same causes of slowness in effecting the earlier operations of parturition exist, as in the twin case; the expulsive power is even more decomposed, since it is communicated through three bodies; there is the benefit in general, however, that triplets are smaller than twins, and the distension of the cervix uteri, the vagina, and the external organs, is not so great as in unipara or twin labors, in consequence of which the last pains are less distressing. I was called in consultation to a lady in labor, in this city, however, who gave birth to triplets, the sum of whose weights was twenty-one pounds and a half; they were fine children; the mother had nearly lost her life from an exhausting hemorrhage, which followed the birth of the last child. The superficies of the placenta, required for the aëration and support of three such children, must have been very vast, and a most powerful contraction of the uterine globe would be required to constringe the uterine orifices after such a labor.

I have never seen a case in which four children were delivered at one birth.

Preternatural labors may be terminated with the hand alone, or by means of instruments. The simplest of midwifery instruments is the fillet, which consists of a ribbon of silk or linen.

The fillet is chiefly employed as a means of drawing down the buttock, in cases of breech labor, where the pains are incapable, without assistance, of completing the delivery. A very good fillet may be made of a strip of linen some three inches wide and twenty-eight or thirty inches in length. It is not always a very easy matter to apply it—and there is great difficulty to get it adjusted in all cases, except when the breech is quite low in the excavation and completely out of the circle of the os uteri. Previously to making any attempt to use it, it should be prepared by drawing it through the hand, filled with a good quantity of lard—or else it may be soaked in thick flaxseed tea, or in white of eggs. Without this precaution, it will not pass over the thigh of the child, or it will rub the surfaces so as to endanger their excoriation.

Fig. 99.



In order to make use of the fillet, let it be passed over the thigh that is nearest to the pubis, as in Fig. 99. Roll up four or five inches of one of the ends of the ribbon into a roller, which may be passed into the vagina, and pushed with one or two fingers between the belly of the child and the front of the thigh which is in contact with the belly. The point of the finger will carry the little ball or roller across the groin either inwards or outwards, as the case may be, and when it has got free from the pressure of the surfaces of contact, the roller or ball at the end may be brought out at the ostium vaginæ, and the remaining portion passed upwards, so as to get the fillet arranged to allow the two free ends to be tied.

The drawing, Fig. 99, shows the appearance of the fillet, when rightly placed, and the mode of operating with it.

The efficacy of its action would be greatly enhanced by placing it upon the groin that is farthest from the pubal arch—but that is a feat of dexterity that can rarely be performed.

In drawing downwards, one should act only during a pain, or coincidently with a tenesmic effort of the patient, and it should never be forgotten, that the neck of the thigh bone is a very frangible thing in the unborn fœtus. This caution is necessary, in order to prevent a fracture or dislocation of the hip-joint. The mere remembrance that such an accident might happen would prevent any prudent person from exerting an undue force with the fillet.

Notwithstanding the reasonable dread of doing mischief by violent and untimely tractions, it is true that very great assistance may by this simple implement be given to the woman in labor.

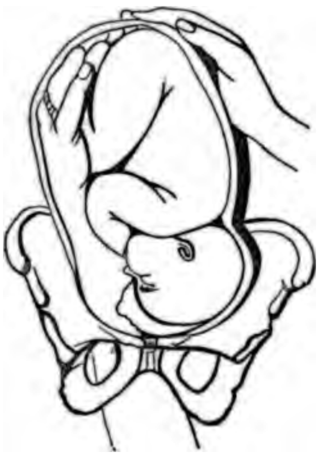
The fillet is also applied, on some occasions, to the wrist in prolapsion of the hand, in order, by means of it, to keep the hand down at the side, when we turn to deliver in shoulder cases. I have never found it necessary to take any such precaution; as I have always thought that I could bring down the arm, in case it should be lifted alongside of the head, and I have not chosen to embarrass myself with the string.

The fillet is also by some writers recommended as a means of securing one foot that has been brought out at the vulva in turning, while the hand is passed upwards again to seek for the other foot. I do not think it necessary. Indeed, when I have got one foot down, I care not much to bring down the other. If it be left in the womb, we have rather an advantage by it; since, in such a delivery, we have the benefit of both the footling and breech labor.

Turning.—The Student has learned that the most natural labor, one in which the vertex presents, in the first position, may suddenly become a preternatural one in consequence of the coming on of hemorrhage, a series of bad fainting fits, convulsions, &c. &c., and which establish the indication to proceed at once to the delivery.

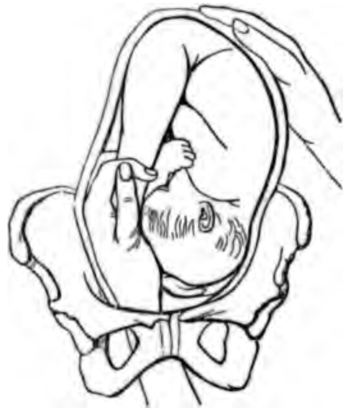
Fig. 100 serves very clearly to express the situation of the child presenting in the first position of the vertex. It may be that this child's head had in a good measure occupied the circle of the os uteri before the accident occurred which established the indication to deliver by turning. If the head had wholly escaped from the circle, the indication to deliver by turning must have been considered wholly set aside in favor of a forceps operation; for in general, when the head has once

Fig. 100.



escaped from the os into the vagina, it cannot be thrust into the womb again, for the cervix uteri will by that time have contracted pretty strongly around the neck of the infant. Hence the rule of practice is to turn and deliver if the head be still in the womb; but if it be in the vagina, we are to extract it by means of the forceps. In fact, if it be wholly in the vagina, it is below the superior strait; but to attempt to return the head through the superior strait and through a contracted os uteri also, is a thing too preposterous to be thought of.

Fig. 101.



The drawing above mentioned, Fig. 100, will show the Student what he will have to do if he makes up his mind to turn. It will show him, namely, that he will be obliged to thrust the head out of the plane of the superior strait, which it occupies, in order to let his hand pass upwards in exploration; he will see, by inspecting the figure, that he must seek for the feet in the right and posterior portion of the upper part of the womb, and as he must push the head, therefore, upwards and to the left, and not upwards and to the right, and must grasp the feet with the palmar and not with the dorsal surface of the hand, which hand shall he use? Let him look at the figure, and he will see that in this labor he must use the left hand, and, carrying that hand upwards according to the directions given in my article on Turning at page 416, he will find the feet one or both as in the figure, and grasping them firmly with the thumb and fingers, he will draw them downwards towards the os uteri, assisting his left hand by means of the right one pressed upon the fundus of the womb upon the outside. In this way, drawing the feet downwards, he keeps the head above the plane of the superior strait by means of his wrist and palm, a precaution he must by no means overlook, lest the head, urged downwards by the force of the contractions, should become engaged in the pelvis together with the foot, as seems about to happen in the drawing annexed, Fig. 102. If, through forgetfulness of duty, or the want of a proper dexterity, he should permit this accident to happen, he would procure for himself superabounding vexations, for his patient a great increase of pain and hazard, and for the child an almost certain death. Let him never forget, therefore, while drawing down the foot, that he must keep the head up if possible.

Fig. 102.

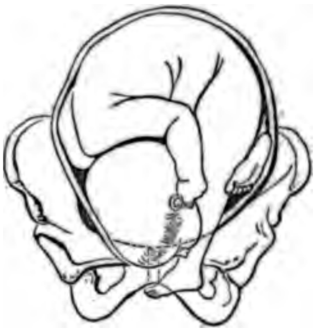


Fig. 103.

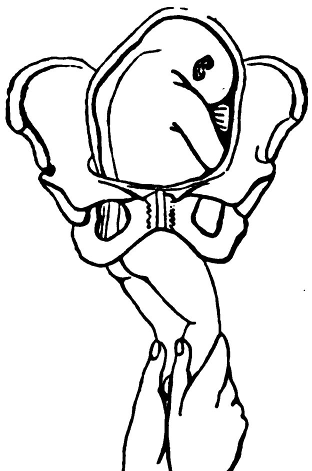
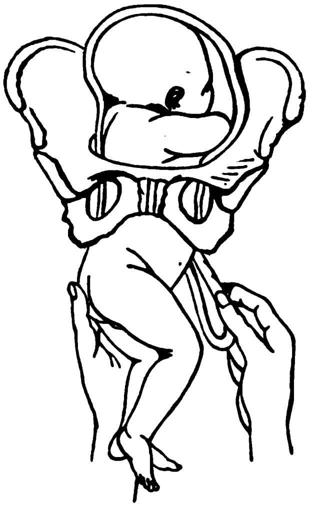


Fig. 104.

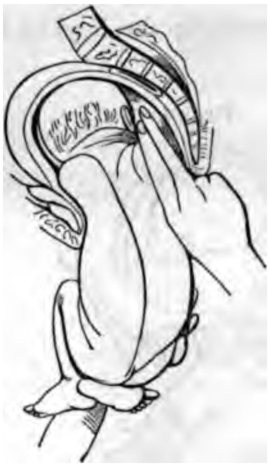


After drawing the feet through the ostium vaginæ, and when the turning is completed, which he will know by an exploration with the t hand of the form of the abdomen, and by perceiving that the of the child are now engaging in the excavation of the pelvis, he ld, if he draws at all by the limbs, make his chief effort of traction by means of the right leg of the child, as in Fig. 103. By acting in this way he will cause the child's face to turn towards the left sacro-iliac junction. Before the turning, it looked towards the right sacro-iliac junction. Let him look again at Fig. 103, in order to see how he would make the face of the child come to the front of the pelvis if he should incautiously make his tractions upon the left foot only.

When he has extracted the child as far as the navel, let him do what is represented in Fig. 104, that is to say, let him carefully draw down a considerable loop of the umbilical cord, setting that organ at liberty, so that no danger may be incurred of breaking it or tearing it out by its roots at the umbilical ring.

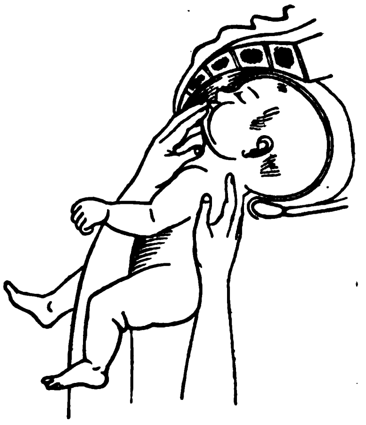
The patient should certainly be now turned upon her back, and the child's legs should be wrapped in a napkin in order to hold them firmly. As soon as a good part of the thorax is expelled, let him pass two fingers upwards to the top of the shoulder that is most conveniently within his reach, raising the body of the child upwards towards the woman's abdomen if he desires to get at the posterior shoulder, or depressing it towards the sacrum if he wishes to act on the anterior shoulder. Sliding his fingers from the acromion as far as he can towards the bend of the elbow, let him force the elbow downwards, causing it to sweep along the breast of the child. As soon as the elbow is withdrawn, the hand will come forth and the shoulder be extricated, after which let him proceed in like manner with the remaining shoulder, using the fingers of the other hand as in Fig. 105.

Fig. 105.



Both shoulders being delivered, let the Student next raise the trunk of the child upwards towards the mother's abdomen, much higher than is represented in the annexed design, Fig. 106. It is extremely important not to forget this rule of practice. What the Student wants at this point, is, a great degree of flexion of the head; let him, therefore, carry the breast far away from the chin by turning the child's trunk upwards towards, or even on, the mother's abdomen, as above directed, and then introducing one or two fingers as far as the child's mouth, let him pull the chin downwards towards the uplifted breast of the child—thus restoring the chin to the breast. As a general rule, this manœuvre will effect the flexion that is to be desired;—not always so, however, for the mouth sometimes may be opened very wide, yet the upper maxilla will not descend to close upon the lower. Let the Student, in this case, push the vertex upwards by means of two fingers inserted behind the symphysis, and then, with a finger on each side of the nose, let him pull the superior maxilla downwards, to make it shut the mouth. The occipito-mental diameter, see-sawed in this manner, will be made to coincide with the axis of the inferior strait, whereupon, pulling with one hand by the shoulders, and by a finger in the mouth with the other, the head may be withdrawn in a direction coinciding with the curve of Professor Carus.

Fig. 106.



Should the resistance to the escape of the head be too considerable, and the child's life be placed in danger from the delay, two fingers of the left hand should be passed into the vagina as high as the malar bones, one on each side of the nose. The fingers being now somewhat flexed, will thrust the posterior wall of the vagina away from the mouth and nostrils, giving free access of the atmospheric air to those orifices; the child, though unborn, will immediately begin to cry, giving time for the patient to rest, and for the accoucheur to consider of his duty. I have heard this *vagitus vaginalis* for many minutes, and, indeed, have in this manner enabled the child to continue breathing until my forceps could be brought, from a considerable distance, wherewith to deliver the head. As to the manner of applying the forceps in this case, I refer the Student to the chapter describing the uses of that instrument.

The Student ought very carefully, yet very promptly, to decide upon the line of duty under the sometimes very sudden emergencies of this sort of labor; to set the matter before him in a clear light, let me reiterate the precept, to turn and deliver if the head be not in the vagina, and to deliver by the forceps if it is wholly expelled from the mouth of the womb. If he should make a mistake as to the point of duty, he might inflict a serious injury upon his patient, by passing the blades of his instrument within the contracting bands of the cervix uteri; or, on the other hand, he might allow her to bleed to death from hemorrhage, while expecting the return of the messenger sent to bring his forceps from the distance of half a mile.

I was sent for to assist a gentleman waiting upon a woman in labor. I arrived at the spot in a very few minutes, and found both the child and the mother dead upon the bed; my friend, the accoucheur, told me that he had been sent for with an urgent request to hasten to the house, but being absent from his office, a considerable delay occurred; when he came to the bedside, he found the woman flooding dangerously, and much exhausted by the loss. Perceiving the exigency of her circumstances, he despatched a messenger in haste to bring his forceps, from a distance more than a half a mile; in the mean time the flooding continued. When the forceps were put in his hands, he was baffled, as he told me, in adjusting them—the head retreating upwards whenever he attempted to apply them: after the loss of an additional portion of time—a fatal loss—he succeeded in seizing the head, and delivering the child, which was dead. The mother expired very soon after the birth of her infant.

Case.—Some years ago, I was engaged by a tailor to take care of his wife in her approaching confinement: he was an avaricious fellow, who disliked nothing more than the payment of a fee. In the middle of the night, his wife was seized with the pains of labor, which immediately became violent and expulsive. He ran for an old woman in the neighborhood, who arrived just in time to receive the child, which she severed, and immediately proceeded to wash and dress it, leaving the woman lying upon the bed. "Ah-ha!" said the tailor, "this is a very good thing; we'll cheat the doctor out of his fee." And so he rejoiced and was very glad; but in a short time the poor woman fainted, and remained for a long time insensible; whereupon, taking the alarm, he came for me in furious haste, telling me that his wife was either dead or dying, and begging me, for God's sake, to give her speedy assistance. I very soon reached the apartment, and found her speechless and pulseless, and pale, and lying in a puddle of coagula and fluid blood. Placing my hand upon her abdomen, I found that there was another child there. I now took away all her pillows; opened the windows; dashed water freely upon her face and neck; and with difficulty succeeded in getting down a few swallows of strong brandy and water: the head presented, I ruptured the membranes, and passing my hand upwards to the feet, seized them, turned, and delivered the child; and immediately afterwards removed the placentas. I was for some time doubtful whether she would live or die, but she finally rallied under stimulation, and got quite well.

I think that four minutes had not elapsed from the time that I reached her apartment until the child was delivered. Suppose that, like my friend mentioned in the former case, I had sent to my house for the forceps, would my patient have survived? Suppose he, instead of sending for his instruments, had immediately delivered her by turning, would he have lost both the mother and her child? It is said, that it is the last straw that breaketh the mule's back. It might as well be said, that it is the last ounce that kills in the uterine hemorrhage.

Having now described the operation for delivery in preternatural labors, the head presenting in the first vertex position, I have to indicate the method of proceeding in the other positions of the vertex. In all important particulars of the management, the former directions may be regarded as sufficiently full. But, as in the second position, the face of the child looks towards the left sacro-iliac symphysis, it is necessary, on that account, to employ in the turning the RIGHT HAND, and not the left hand, as before.

By introducing the right hand for the operation, the head will be pushed out of the plane of the strait to the right upwards, and made to lodge in part upon the brim, and in part upon the wrist and inner face of the forearm, while the fingers, going up along the breast and belly of the child, seek for, and at length find, the feet.

When caught, one or both the feet are to be brought out at the os uteri into the vagina, and so through the ostium vaginæ. Due care should always be used not to force the version while the uterus is contracting. It may be expected to contract several times during the act of turning.

Inasmuch as the face looked to the left sacro-iliac junction at the beginning, it might be expected, when completely turned, to look towards the right acetabulum, and it would probably do so, if care were not taken to draw chiefly upon the left foot: by doing which, the left trochanter will be brought to the arch, and then it may, as soon as it has completely come forth, be forced over towards the right ischial ramus, which will serve to bring the left shoulder also to the right acetabulum, when that part begins to engage. The face of the child will of course, under these circumstances, be turned to the right sacro-iliac junction, and finally sink into the hollow of the sacrum. I need not here reiterate directions, already sufficiently explained and insisted on in the former article.

The operator may find the child that he is about to turn, presenting in the fourth position of the vertex, in which case the forehead will look to the left acetabulum, and the vertex be directed to the right sacro-iliac junction. In order to turn in this position of the child, he should employ the right hand, which, passing up on the left side of the pelvis, between the face and the brim, thrusts the head towards the right and anterior semi-circumference of the strait, where it must be resisted by the wrist or arm, while the fingers explore the cavity in search of the feet. If the child were turned without being rotated upon its axis, its face, after the version, would be at the right sacro-iliac junction, and this would be well; but still, in order to insure an occipito-anterior position of the vertex after turning, it would be safest to act chiefly upon the left foot in making the tractions. I shall not repeat the directions for the other parts of the process.

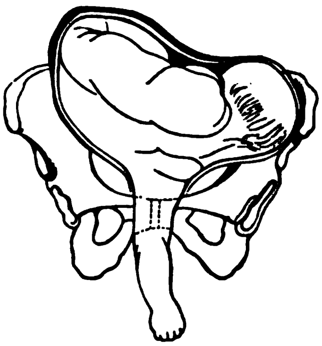
In the fifth position, the fontanelle is found at the left sacro-iliac junction, and the top of the forehead at the right acetabulum. If the woman were lying on her left side and the accoucheur seated with his face turned in the opposite direction to hers, he might, very conveniently, employ his right hand in version, for the palm of the hand slightly pronated would glide along the right side of the breast and abdomen of the child in search of the feet, which then might readily be drawn down. The child, having been completely turned, would have its face addressed towards the left posterior part of the womb; in making the last tractions, therefore, the Student ought to be advised to draw chiefly upon the right foot in order to bring the right trochanter to the pubic arch, and, as soon as it shall have been fairly expelled, turn the trochanter towards the left ischial ramus, which will secure the descent of the shoulder in the neighborhood of the left acetabulum, and the subsequent engagement of the head in an occipito-anterior position. There is no necessity for repeating the minute directions as to the conduct of this version.

In cases of version in the third and sixth positions, cases never likely to occur, the accoucheur could use either the right or the left hand, as he might deem most convenient to himself; the choice being indifferent, the occipito-frontal diameter of the child coinciding with the antero-posterior diameter of the pelvis.

Turning in Shoulder Presentations.—The turning and delivery of the child in head presentations are less difficult than in the operation which is required for version in shoulder cases.

In a former part of this volume, I have stated that there are two shoulder positions for each shoulder, making four in all. There are two positions for the right shoulder. In the first, the head of the child is on the left side of the pelvis, as in the annexed figure 107. This figure represents a shoulder presentation with the right hand prolapsed; the palm of the hand will look toward the mother's back, and its dorsum towards the front of her pelvis; the face looks backwards, and the feet of the child are in the back part of the womb, so that, in seeking for them, the accoucheur should pass his hand along the breast of the child, and expect to find the feet not far from the sternum of the infant. To pass the hand between the child and the pubes would be to make a distressing mistake, for it would be impossible to turn the child in that way, and it would be wrong to expect to find its feet lying upon its back. To perform version the woman should lie upon her back, the hips being near to the edge of the bed, the thighs abducted, and strongly flexed upon the pelvis: the right hand should be chosen, (to look at Fig. 107 is enough to show that the right hand is the preferable one,) for the points of the fingers easily direct themselves towards the pelvic extremity of the fœtus; and a moderate supination of the limb applies the hand to the breast and abdomen of the child; the fingers could scarcely close between the abdomen of the child and the posterior aspect of the womb, without grasping the feet or knees, whereas, to use the left hand would be to point the fingers towards the cephalic extremity of the fœtus, and if the feet should be caught in that way, it would be necessary to let them go again. Therefore, in the first position of the right shoulder presentation, the Student will be careful to employ his right hand for version.

Fig. 107.



Suppose the Student, in performing this version, should take hold of the left foot of the child, he would (let him look at Figure 107) cause it to revolve upon its axis and bring its face towards the mother's abdomen. This is what he desires not to do, for the chief intention which he should set before him is that of bringing the vertex to the symphysis, and the face to the sacrum. He ought to get both feet, if possible: having both feet in his hand, it will be in his power to draw the child by the right foot, which will bring the right trochanter to the pubic arch, and the right shoulder to the left acetabulum, which will let the face come into the pelvis looking backwards towards the left.

The second position of the right shoulder presentation is neatly figured in the accompanying drawing, Fig. 108. It represents the body of the child very much compressed by the contracted womb, from which the waters have been expelled, and the hand of the accoucheur, which is here the right hand, partially engaged in the cervix uteri, seeking for the feet. It would be as well, in this particular labor, provided the patient were lying on the back, to use the left hand in version; but, if she were lying upon her left side, the right hand would be far more convenient than the left, since, introduced between pronation and supination, it would apply itself to the breast and abdomen of the child.

Fig. 108.

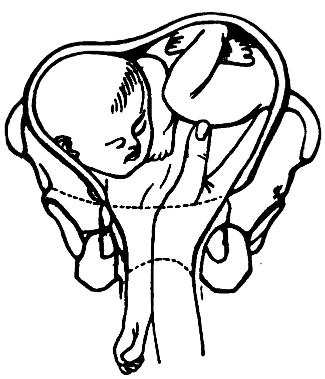
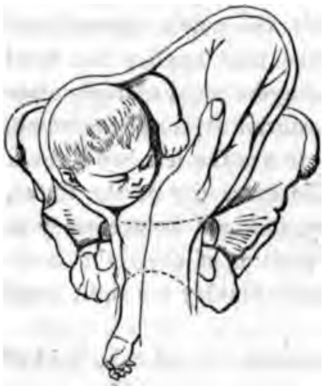


Fig. 109 shows the process of operation, which is here being properly conducted, for the tractions are being made upon the left limb, which would serve to roll the child upon its axis so as to turn its face towards the posterior semi-circumference of the pelvis.

Fig. 109.



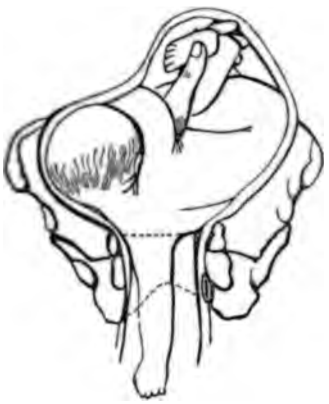
The left shoulder presentation has, likewise, two positions. In the first of them, the head is found in the left side of the pelvis, and the face of the child looks front. In the second, it is placed toward the right side of the pelvis, the face looking backwards. In the first position, the left arm being down, the feet should be found between the belly of the child and the anterior wall of the womb; the rule obtains, therefore, in this as in all cases, of passing the exploring hand upwards along the front of the child's body. If the woman were lying upon her left side, with her knees drawn up with a pillow between them, the palm of the right hand would readily apply itself to the anterior aspect of the fœtus: the left hand would be highly inconvenient for this operation; it might be used in the dorsal decubitus, but not so conveniently as the right.

The child's face is looking to the front; it ought to be rolled upon its axis so that the face may look backwards, giving it at last an occipito-anterior position; therefore let the operator direct his chief efforts upon the right inferior extremity, which alone can roll it upon its axis.

In the second position of the left shoulder presentation, the head is on the right side of the pelvis looking backwards, the left shoulder is down, the hand or elbow prolapsed or not; it is indifferent whether they be or be not prolapsed.

Figure 110 explains the operation; the left hand is employed, for its fingers go out towards the pelvic extremity of the child, and its palm, in easy pronation, adapts itself to its anterior aspect. If the Student should draw the child down by the right inferior extremity, he would roll it on its axis. This would be wrong, since the child's face is already backwards; let him, therefore, make his chief tractions by the left limb, in order to bring the left inferior extremity to the symphysis, which, after it is born, should be rotated towards the right ischium, which will serve to bring the face into the hollow of the sacrum at last.

Fig. 110.



I ought not to omit some reference to an accident which occasionally happens, whether in version or in original pelvic presentations. I allude to the locking of the head above the brim of the pelvis, which becomes keyed there by the forearm; the elbow being elevated, and the hand projecting backwards beyond the nucha, serves as a key to prevent the head from sinking into the excavation. When the pressure, in consequence of aggravated contractions of the womb, becomes very great, it is nearly impossible to disengage the hand from behind the neck, by depressing the elbow by means of the fingers in the way formerly pointed out;—it is easier to break the delicate bone of the humerus than to bring the elbow down. Dr. Dewees's method, one upon which he very strongly insisted in his lectures, was to pass two fingers upwards in front of the shoulder-joint, and two fingers up against the opposite scapula. By means of the pressure in contrary directions of these two opposite hands, the thorax of the child is made to revolve upon its axis one quarter of a circle; the hand is disengaged from behind the throat by this rotation, and immediately afterwards brought down by pulling at the bend of the elbow.

It has often been proposed to restore the head to the brim of the pelvis, in cases in which it has deviated, so as to allow another part of the fœtus to present itself there. I have on different occasions attempted to succeed in this version by the head, but have always signally failed, with the exception of a case which I have already related in a former page of this work. In that instance, I succeeded by means of pressure made upon the external surface of the abdomen. The attempts might always be made with propriety in those cases in which the contractions of the womb have not as yet driven the presenting parts firmly into the opening. With a loose and flaccid uterus, the Student might have the good fortune, after lifting the shoulder out of the way, to lodge the head fairly in his palm, and pushing the fundus uteri in an opposite direction so as to raise the breech of the child, draw the head to the abdominal strait and let it engage therein. I think no very violent efforts should be made to effect this kind of version; and it must be rarely that the os uteri will be found dilated sufficiently to allow of the operation being even attempted—for, when the os is well opened, the presenting part is already far down in the excavation.

CHAPTER XIV.

PRETERNATURAL LABOR FROM DEFORMED PELVIS.

THE thirteenth chapter of this volume, on the subject of preternatural labor, which had been drawn out to so great a length, was brought to a close upon the last page; and I closed it because I have at present to enter upon the consideration of those preternatural labors that are rendered so by deformities of the osseous pelvis, and also by fleshy and fibrous or other tumors, that, growing from the walls of the pelvis, or that, having fallen down into its cavity from above, impede, obstruct, or wholly prevent the completion of the parturient act.

In a former part of this work, to wit, in Chapter I., I have already treated of the pelvis as normally constituted. The Student, from reading that chapter, has become acquainted with the dimensions of the planes of the two straits, and the capacity of the excavation.

The Student knows that the osseous frame consists of a soft gelatinous material which hath become rigid and extremely solid and compact by the deposit within it of portions of phosphate of lime. He knows that to macerate a bone in a strong acid solution is to dissolve out from it entirely the whole of its calcareous and solid matter, leaving to the bone its pristine form and dimensions, but leaving it, at the same time, compressible and flexible in every direction; for all that is left of the bone after the maceration is a gelatinous mixed with a proportion of fibrous and cellular material.

Now the child that is born may become, in one of the early years of its existence, the subject of a disease, one of whose most prominent characteristics is to prevent a deposition of the calcareous phosphate in the substance of the gelatinous framework of the bone; not wholly, indeed, but to such a degree as to leave the bone softish and compressible, or flexible. Again, a child may grow up in apparent health, having conformably developed all the parts of its constitution—its phosphatic deposits having been rendered complete up to a certain term, and giving to its bones a due degree of solidity and firmness;

whereupon it shall be attacked with disease, whose effect shall be to remove from the gelatinous framework of its bones a large proportion of its calcareous solid.

These two cases present examples, the one of a suspension of the process of deposition, and the other of a removal of the phosphates already deposited. The former is Rachitis, or Rickets. The latter is Mollities ossium, or softening of the bones. The effect is the same in either case. In rachitis, the child continues to grow without removal of the ancient phosphate, and the bone bends or is crushed. In the latter, the ancient phosphate is removed, and the bone bends, or is crushed. It bends, or is crushed under superincumbent weight. If the child laboring under rachitis should recover from that malady, it would regain its power to solidify its bone, by depositing calcareous matter within its intimate structure. But, should the solid matter be replaced while the bone in its plastic condition is pressed or bent out of its due shape, it might regain the most consummate health, and remain ever after affected with deformity of the bone in question.

If the humerus, the radius, the femur, or the tibia, should regain its solid phosphate, those several bones would be found arcuated—bent like a bow—and remain ever so. If the ossa innominata, which consist of the ilia, ischia, and pubes, should be the seat of the softening processes, and if, during a long-protracted illness, the child should lie chiefly upon her right side, or upon her left buttock, the sacro-pubal diameter of the pelvis would allow its pubic extremity to be turned towards the right side of the child, and *vice versâ*. This would produce what is called the obliquely-deformed pelvis—dass schraage verengte beckens—of Professor Nægèle of Heidelberg.

The Student will perceive that such a pelvis as this must lose a portion of that diameter which extends from the left acetabulum to the right sacro-iliac symphysis, provided the pubis be deflected to the right side, and so, *mutatis mutandis*.

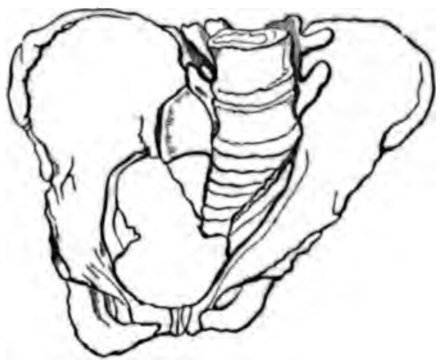
In case the Student should be charged with the conduct of labor for a woman affected with right oblique-deformed pelvis, he will perceive the necessity there is to direct, if possible, the vertex of the child to the right rather than to the left acetabulum of the mother; for, as the occipito-frontal diameter of the fœtus exceeds its bi-parietal diameter, he would sedulously endeavor to make the greatest diameter of the head coincide with the greatest diameter of the pelvis, in order to render the delivery comparatively facile, which would be difficult, laborious, and even impracticable, were he to persist in attempts to force the long diameter of the head through the contracted diagonal of the pelvis.

This is one of the cases in which turning and delivery by the feet are allowable in the deformed pelvis.

Having made a perfect diagnosis of the deformity, he will find himself able, in performing the act of version, to adjust the smallest diameters of the fœtal cranium in such a way as to make them coincide with the smallest diameters of the pelvic passages.

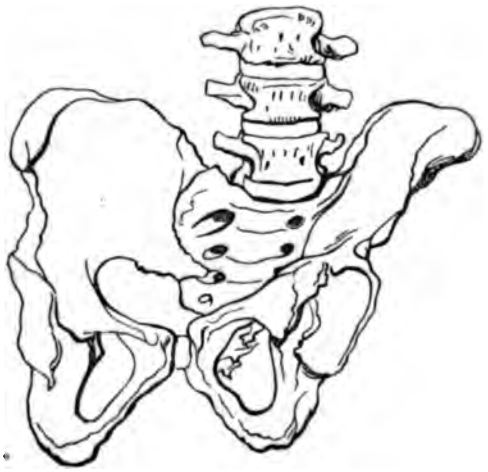
The annexed figure is taken from Professor Nægèle's work on the oblique-deformed pelvis. It is seen, by inspection of the figure, that, if the vertex of the child should be directed towards the left acetabulum, the dimensions of the pelvis are so much diminished by the fall of the pubis towards the right, that little expectation could be indulged of the descent of the cranium below the plane; for the antero-posterior diameter of the cranium exceeds four inches and a half, while the bi-parietal diameter is 3.88.

Fig. 111.



I subjoin the figure of a pelvis preserved in my collection (Fig. 112). It will be seen that it is right oblique deformed, like that described by

Fig. 112.



Professor Nægèle. I give the figure of it, in order that I may set down on this page its dimensions, which I now carefully measure.

From the promontory of the sacrum to the top of the symphysis pubis, 3.6; from the promontory of the sacrum to the point of the coccyx, 3.5; from the right acetabulum to the left sacro-iliac junction, 4.1; from the left acetabulum to the right sacro-iliac junction, 2.7; from the top of the right ischium to the top of the left ischium, 3.7; from the inner lip of the right tuber ischii to that of the left tuber ischii, 3.5; from the point of the coccyx to the crown of the pubal arch, 4.2; from the point of the coccyx to the inner lip of the left tuber, 1.9; to the right tuber, 3.5; the length of the symphysis pubis, 1.

I shall proceed now to speak of other deformities of the pelvis. Rachitis or Mollities does not necessarily affect the whole of a bone. The figure 113, which I subjoin, represents the plane of a superior strait like the figure 8. It is evident upon inspection that the posterior semi-circumference of the pelvis has not suffered at all in its form, as the Student may perceive by comparing it with Fig. 114, which I have taken from the pelvis of an Egyptian lady of rank from the tombs of Thebes, which specimen was presented to me by my friend, the late Samuel George Morton, the distinguished author of the *Crania Americana*. This pelvis, which is one of the most perfect specimens of the female pelvis that I have ever seen, may serve here as a means of comparing the posterior semi-circumference of the badly deformed pelvis, Fig. 113, with the posterior semi-circumference of this most perfect Egyptian form. It shows that the deform-

Fig. 113.

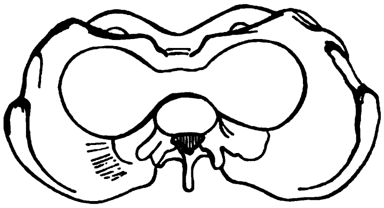
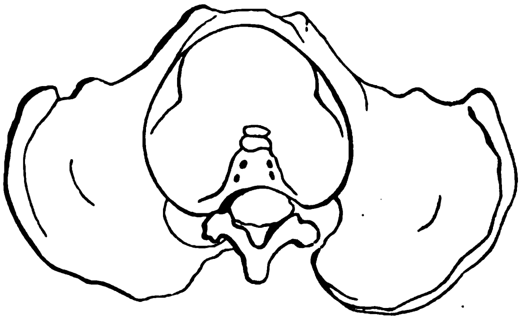


Fig. 114.

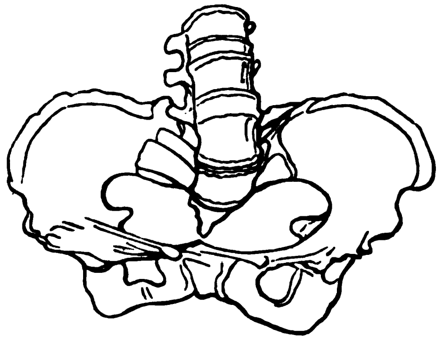


ity in Fig. 113 has arisen from rachitis or mollities affecting chiefly the pubal and ischial portions of its ossa innominata, which, having fallen inwards upon the promontorium of the sacrum, have so reduced the antero-posterior diameter of the superior strait as to render the passage wholly impracticable for the full-grown fœtus.

In such a pelvis as this, the pregnant woman ought to be advised to submit to an early abortion, whereby she might be preserved from an ultimate direful necessity to undergo a frightful Cæsarian operation; for, when the antero-posterior diameter of the pelvis is only an inch and a half in length, it is impossible to extract through it a full-grown fœtus, except that fœtus be either of an under size or else in a state of absolute decomposition; circumstances not to be expected, and therefore not to be relied upon, nor scarcely to be hoped for. Dr. Simpson's late case, published in an English journal, might serve rather to mislead the practitioner with vain hopes of an unparalleled good fortune like that which his patient enjoyed, than as a precept to be generally followed.

I annex the figure of another pelvis (Fig. 115), in which the distortion has attacked the sacrum itself, as well as the pubes and ischia, and partially the left ilium. In such a pelvis as this, provided the antero-posterior diameter should not be reduced below three inches, good hope might be entertained of extracting a living child by means of dexterous and most patient use of the obstetric forceps; especially should the child be rather under size and one in which the progress of ossification had not gone so far as to render the bones of the cranium very firm and resisting. But, as a child's head, in its bi-parietal diameter, according to my measurements, will average 3.88, and as, in a series of three hundred heads, I found but one under 3.50, there will be in general but faint prospect here of extracting a full-grown child alive. The records, however, contain abundant examples of cases in which the fœtus at term was spontaneously expelled in pelves reduced as low as 2.50. In the treatment of such a case as the one now under consideration, the least reflecting Student must perceive that, in adjusting the position of the head, it would be desirable for

Fig. 115.



him to bring the bi-parietal diameter, which is the smallest diameter of the head, into coincidence with the antero-posterior, which is the smallest diameter of such a pelvis; and further, that, in any attempt to assist the natural powers by means of the obstetric forceps, it would be preposterous for him to think of adjusting the blades upon the sides of the head in that direction. The pelvis is already perhaps fatally small. To apply the blades of the forceps, then, would be considerably to increase the necessity for the reduction of the transverse diameter of the head. Common sense, therefore, would teach him that, if he must apply the additional force, it must be applied to the face and occiput of the child. The blades of Davis's forceps, even when the handles are perfectly shut, are 3.9 asunder. It would be impossible, therefore, to extract the forceps in that direction, much more the head contained within them.

I believe that the practitioners of midwifery in England are less familiar with the use of the forceps than those of the continent or of the United States. I think them quite too prone to refer to the aid of the crotchet and perforator; and I cannot but indulge a disposition to dissent from their almost invariable habit of adjusting the blades upon the sides of the head, much preferring the practice of the continental physicians and those of the United States, who seize the head upon the sides of the pelvis—a practice as to the safety of which I confidently speak from multiplied opportunities in my clinical experience.

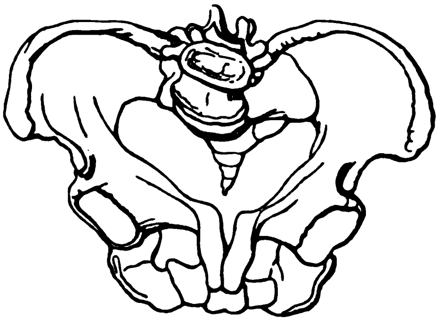
This is a case, also, in which, perhaps, more properly than in other cases, the precept should be observed of attempting to deliver by turning. Those who, in restricted pelvic diameters, propose the resort to turning as a means of saving the child, and at the same time of preserving the woman from much pain and greater danger, insist upon it that the chance of preservation is greater, because when the child has been turned and drawn away, so as to allow the head to come to the narrowest part of the pelvis, the cranium yields, allows its diameters to be reduced, and may be disengaged from a narrow strait, through which it could not be driven if the head were the presenting part. The idea is this: when the head is drawn through by means of traction exerted upon its neck, it undergoes a process which, as I take it, is not wholly unlike that called *wire-drawing*, whereas, when the head presents, such a process of wire-drawing cannot be supposed readily to take effect. A portion of metal can readily be drawn through the apertures of a wire-plate, which no art could drive through it from the other side.

I am not prepared in this place to go so far as Professor Simpson of Edinburgh, in recommending a resort to version in bad pelves; and my hesitation arises from this, that the mensuration of the pelvis being rather a non-dependable operation, there is reason to fear that the incautious and inexperienced accoucheur might, by too free a recommendation of it, be led to institute this method in cases where the reduction of the diameters is so considerable as to render an excerebration indispensable for the delivery of the head. I admit that it is possible to effect an excerebration in the footling case; but in every case of a badly deformed pelvis, that operation implies an exceeding great risk of detruncation—an accident the most to be deprecated; for what occasion can arise for embarrassment and vexation greater than that which he experiences who is condemned to the task of extracting a detruncated head through a very much reduced superior strait of the pelvis!

In Dr. Lee's 3d *Report Clinical Midwifery*, p. 74, 3d ed., he gives the account of several cases of footling labors, occurring in deformed pelves, in which he was obliged to diminish the head by opening the cranium through the occipital bone. In some of these cases, that able and most dexterous practitioner frequently found himself greatly embarrassed in effecting the operation. To read his accounts of the cases, would be sufficient to put the Student upon his guard against the risk of encountering those embarrassments from version in deformed pelves of which I have spoken.

Here is another pelvis, Fig. 116, in which the rachitis has attacked the whole organ; for the last lumbar vertebra, as well as the ilia, ischia, and pubes, are all changed in shape. The horizontal portions of the pubes have become almost parallel, narrowing, of course, the antero-posterior diameter of the pelvis, and approximating the extremities of the transverse as well as the oblique diameters, so as to render hopeless any attempts to extract the living child through it.

Fig. 116.

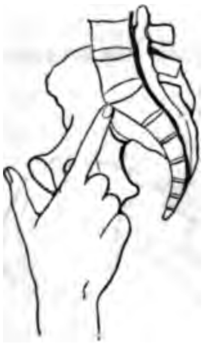


It appears to me to be needless to follow the example of those writers who have reduced the deformities of the pelvis into a sort of classification. It is evident that the softening of the bones, which, as I have already said, may attack the whole or any part of the osseous structure of the basin, may yield every conceivable degree of irregularity of form; and those that I have already spoken of in this article are sufficient to show the Student what is the nature of these deformities; and as he is already acquainted, from a former chapter in this volume, with the mean dimensions of the fœtus, he may be regarded as already qualified to give his judgment upon questions of the obstetrical operations arising under pelvic deviations.

It is necessary that he should be aware of the methods which are adopted for ascertaining in the living woman the dimensions of the pelvis. As a general rule, the indicator finger of the accoucheur will scarcely be found capable of extending further than three and a quarter inches or three and a half inches beyond the crown of the pubal arch. It is true that, by the introduction of half the hand, the palp of the indicator finger can be made to explore a region four and a half inches distant from the crown of the arch; but, as the introduction of half the hand in the woman not in labor, or affected only with the earliest stages of labor, is so painful as to excite the greatest repugnance and resistance on the part of the patient, the vaginal taxis is generally preferred with the indicator alone.

Suppose there should be some suspicion of a degree of deviation of the pelvis—one in which the pubis has retreated towards the sacrum, or one in which the promontorium has descended towards the symphysis pubis. If he should carry his indicator finger as in the annexed figure, directing it towards the promontory of the sacrum, and in vain therewith endeavor to touch the sacro-vertebral angle, his exploration will teach him at once and clearly that his patient has nothing to fear on this head; but if he can readily touch it, as in the figure, then she has a deformed pelvis, proportional to the facility of the touch.

Fig. 117.

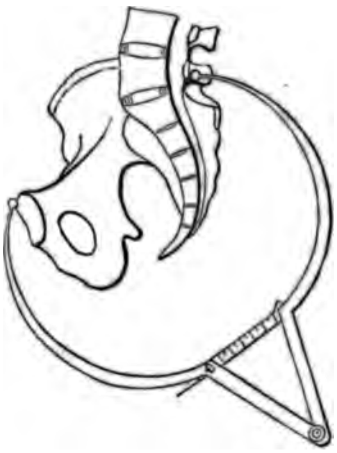


If, again, the point of the cocoyx, which can always be touched with the indicator finger, is found not to approach too close to the crown of the pubal arch, uneasy apprehensions on this head are at once set aside. As for the mensuration of the transverse diameters of the inferior strait of the pelvis, the least tact, with but little experience, would show that that strait is or is not normal, and to what degree deviated, if at all.

If, however, upon introducing the index finger, it should at once encounter the sacro-vertebral angle, pressing the point of the finger against the protuberance, and lifting its radial edge up to the crown of the arch, with the finger-nail of the other hand he can mark the point of contact with the top of the arch, and then, measuring the distance to the point of the finger, he will have an accurate report as to the antero-posterior diameter.

It appears to me that there is no necessity for the Student in this country to trouble himself to make a provision of callipers to measure the pelvis externally, in order to get a report of the internal diameters of it; nor need he, in my opinion, procure any intro-pelvimeter, which is more apt to mislead him than his hand is; and which, moreover, is both inconvenient and painful in its application. Nevertheless, if he should be inclined to avail himself of the use of the callipers, he will perceive in the annexed figure the mode of its application. Applying one of the buttons of the calliper to the symphysis pubis, and the other to the spinous process of the fifth lumbar vertebra, the scale will mark the space by which the buttons are divided. Let him subtract from that space half an inch for the thickness of the symphysis pubis, and two and a half inches for the space between the sacro-vertebral angle and the spinous process on which the button rests, he will have three inches to deduct from the whole sum; the remainder is to be taken as the antero-posterior diameter of the plane of the superior strait. If he will please to refer back to Fig. 116, in which the pubis projects in consequence of the parallelism of its horizontal rami, he will at once perceive the futility of an attempt to deduce the internal capacity of that pelvis from an external measurement.

Fig. 118.



The great matter is for him to determine the indication of treatment in the case, and that indication must clearly arise from a consideration of the actual state and wants of the patient, and not from any rules or precepts that can be set down in any book whatever. A gentleman might, for example, be impressed with the propriety of trusting to the unassisted powers of nature a patient whose antero-posterior diameter at the superior strait is three or even less than three inches, and he would be led to do so from an opinion he should form of the ability of the woman to support for a long time the efforts and the irritation of a most laborious labor; whereas, in another patient, having a pelvis of precisely the same dimensions, he should perceive the most urgent necessity to deliver immediately, in order to preserve her from an otherwise inevitable death.

Besides the deformities of the pelvis from mollities ossium and rachitis, there are other affections of the capacity of the basin, which are produced by bad arrangement of the form of the pubic arch—cases in which the arch is Saracenic, and not Roman; the descending rami of the pubes, instead of divaricating so considerably as to allow the rounded occiput to rise quite up into contact with the triangular ligament of the pubis, here compel it to descend far below the crown of the arch, in order to extend itself and be born.

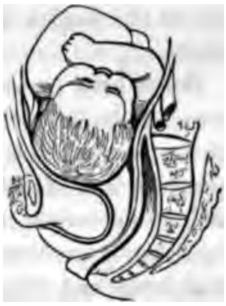
Such a condition of the arch of the pubis is precisely equivalent to a preternaturally long symphysis of the bones. The easiest labor, *cæteris paribus*, is that in which the symphysis pubis is the shortest—that in fact in which the symphysis is but a narrow bar under which the head has an early opportunity to be extended, in the third act of the mechanism of the head in the labor. In all cases where the arch is very narrow, and the head is compelled, in consequence thereof, to descend very low previous to commencing its act of extension, the distress of the patient and her hazard are considerably augmented by the concurrent necessity of thrusting the perineum so much further down as the head is compelled to descend, previous to commencing its act of extension. I have seen labors in which the woman made the most desperate efforts at expulsion before success could crown her exertions; and I have been compelled, in consequence of this species of deformity, to exert all my strength and dexterity to extract the fœtal head with the forceps.

I have said, in another page, that the obstetrical properties of the pelvis depend mainly upon the conformation of the anterior aspect of the sacrum. Where its curve is too great, the point of the coccyx interferes with the antero-posterior diameter of the inferior strait, and where the curve is too small, that most important act in the mechanism, to wit, the rotation of the head, is rendered difficult, if not indeed impossible. I speak, from painful experience, of the difficulties I have encountered from this cause, in cases in which, having found the spontaneous rotation not possible, I have been compelled to effect it by locking the child's head in the blades of the forceps, and then, with a difficulty, and cautiousness, and slowness, and doubt, calculated to impress my mind with a sentiment not very different from one of horror, and with protracted efforts, finally crowned by success as to the mother at least—and sometimes, both for the mother and child—have thanked God for their escape.

Case.—On the 5th of January, 1849, I delivered a lady—the same one whose Case is mentioned on page 29—of her seventh child. It was the fifth forceps operation required in her case. The child's head measured, in its occipito-mental diameter, six inches; its occipito-frontal was $5\frac{9}{20}$ths, and its bi-parietal $4\frac{9}{20}$ths. There was no rotation. The left-hand blade of my forceps was applied upon the occipital region, and the right-hand blade upon the frontal region. After the most exhausting efforts on my part, and unspeakable suffering on hers, the child was delivered with its vertex to the left tuber ischii, and its forehead to the right. To-day, January 9, the mother and child appear to be in perfect health.

Notwithstanding I have already, at page 289, spoken of those cases of labor rendered preternatural by prolapsion of the bladder, more properly to be called vaginal vesicocele, to which I beg here to refer the Student, I annex a drawing, (Fig. 119,) which may serve to show the mode in which the over-distended bladder may get beneath the head so as to prevent its descent. The most fatal consequences might ensue from a mistake in the diagnosis of this case, of which the remedy is to be found in the use of the catheter.

Fig. 119.



In a former part of this book, is contained an account of a case that occurred to me in consultation with Dr. Bicknell—that of a woman in whom a large mass of intestinal convolutions had fallen down below the uterus and filled the cavity of the pelvis, occupying the recto-vaginal cul-de-sac, and distending it to an enormous size. This was a cause which converted an otherwise perfectly healthy labor into a preternatural one. I think it probable that the woman would ultimately have fallen into a state of exhaustion, or that she would have developed inflammation in the mass of half strangulated intestinal convolutions, had not the cause of difficulty been ascertained, and the labor brought to a rapid conclusion by the return of the prolapsed bowel into the cavity of the abdomen. It is proper to cite the example in this connection, were it merely to indicate to the Student the possibility of such an occurrence, and the necessity of interference in the case. I shall dismiss the subject, merely referring the reader to the page above mentioned.

Cases are mentioned of labors rendered preternatural by the engagement of a firm tumor, consisting of altered ovary occupying a very considerable part of the excavation of the pelvis, preventing the descent and passage of the head. The rule of action should be, under such circumstances, to endeavor by all the means in one's power to return the tumor above the strait; and, as such a tumor must necessarily be behind the uterus, and not at the side or in front of it, the attempt to push it out of the way would be far more likely to succeed, were the patient placed upon the knees, the top of the breast being pressed upon the same plane on which the knees rest: the pelvis being thus elevated, the uterus would be by gravitation drawn far upwards out of the pelvis, leaving a more ample space for the reposition of the tumor, and it should further be observed that the patient placed in this position is completely deprived of the tenesmic power, or the bearing-down power, a slight exertion of which would be sufficient in almost any case to contravene the efforts of the practitioner. In all such cases, then, I advise the Student to cause his patient to be placed in the position above indicated, and then, with the hand in the vagina or one or two fingers in the rectum, endeavor to displace the tumor upwards.

It has been recommended, where displacement of the tumor upwards proves to be impossible, to endeavor to reduce its magnitude by puncturing it with a trocar, or incising it with a bistoury through the posterior wall of the vagina. I do not feel at liberty to recommend such an operation in this volume—an operation which could only be legitimately performed, upon due and mature consideration with the most acute and able practitioners of the vicinity. They alone should feel themselves vested with the authority to act under such terrible circumstances. I may merely remark, *en passant*, that an incision into the posterior wall of the vagina, should it even have the good effect sufficiently to reduce the size of the tumor, fearfully exposes the patient to the risk of vaginal laceration from the subsequent distension by the descending head, and the escape of the child into the peritoneal sac. A small aperture in the thin posterior paries of the tube is more likely to yield and become a frightful laceration, than to resist the distending force of the advancing head. I consider myself fortunate in not having met, up to this time, with a case of enlarged and hardened ovarian tumor or fibrous tumor occupying and rendering impracticable the pelvic cavity.

I saw, in consultation with Dr. Beesley of this city, a lady in whom a large heterologue mass seemed to spring from the left semi-circumference of the brim of the pelvis and iliac fossa, overhanging apparently nearly one-half of the plane of the superior strait. When the labor came on, the bag of waters was formed, the vaginal cervix became farciminal or cylindrical, so that, having got beneath the overshadowing mass, it lifted it upwards and turned it over to the left side, permitting the head to fall into the chasm of the excavation, whence it was soon happily expelled. After the birth of the child, the tumor resumed its former position, and the woman recovered.

Laceration of the Womb and Vagina.—The present caption indicates the most terrible accident which can happen to women in labor. The uterus in some instances yields to the force of non-coordinate contractions: certain portions of the organ proving stronger than certain other portions, the weaker portion may be supposed to lose its muscular power of resistance, whereupon its mere textural resistance becomes incompetent to resist the strain upon it, caused by the contraction of the most perfect and contracting parts; it grows thinner, and then a solution of continuity takes place, and a rent or laceration, of greater or less extent, exposes the patient to the frightful risk of discharging the child and the contents of the womb into the peritoneal sac, among the convolutions of the bowels.

It appears to me far more probable that these lacerations, or ruptures, as they are called, will commence in the posterior wall of the vagina, nigh to the cervix uteri, where the vaginal wall consists merely of the mucous body and vaginal cellular tela, resting upon a basement texture which is peritoneum merely: the tube is so thin at this place that it is surprising to witness its power to resist in certain labors wherein women, to the amazing expulsive powers of the uterus, add the vast power which they are capable of exerting by means of their adjutory muscles. When this tissue becomes still more thin, as in being distended by a very large head, one would think that a fissure of a line in length might prove the beginning of a laceration in which the rest of the vagina and the vaginal cervix would give way like a bit of worn linen. In any such case, if the head or presenting part should escape beyond the tube of the vagina, or the wall of the uterus, the pain will be likely to become greatly exaggerated by the stimulation of such an event; and the uterus would make haste to free itself of its burden *quâ data porta.*

Upon the expulsion of the child and the contents of the uterus into the belly, the labor is at an end, *quoad* the uterus; the labor-throes cease, and a great calm immediately follows the accident, which is suspected to take place merely upon such a sudden and extraordinary cessation of the activity of the process, but which is known to have taken place, upon discovering that the presenting part is no longer to be detected, in consequence of its having escaped from the cavity which detained it.

In regard to the point of duty in the management of such cases, I have to remark that, upon discovering even the smallest commencement of a laceration of the vagina or cervix uteri, the earliest practicable precautions should be taken to insure delivery *per vias naturales*, and the prevention of the escape of the child into the peritoneal sac. This should be done, where it is practicable and convenient, by seizing the head, if it be the head, in the grasp of the obstetrical forceps; by bringing down the feet, if it be a breech; by turning and delivering, if it be a shoulder case; or by turning to deliver, if it be a case of face presentation, or departure of the chin, or any condition, indeed, in which the operation of version would be most likely to rescue the woman from the dangers by which she is surrounded.

Should the laceration have permitted the child to escape at once into the peritoneal sac, let the attendant lose no time, but bare his arm, and resolutely, with his hand passed through the rent, explore the abdomen in search of the feet, which he should immediately withdraw through the opening of the laceration. But if this be not done; if some hours should have elapsed subsequent to the occurrence of the accident; if the woman be already much exhausted by hemorrhage, by constitutional shock and irritation, the question will arise as to the properest manner of fulfilling the indication, which must ever be to extract the child. The hemorrhage will now have been stayed: were it not so, the woman would be already dead; to pass the hand through the rent, should it be in the vagina, would be to set the hemorrhage again on foot. It will be always impossible to pass the hand through the rent in the uterus, because the uterus, being now contracted, will have reduced the size of the rent in proportion to the condensation of the organ. The child can never be returned through a contracted rent, having passed through it while the uterus was yet undiminished in size. I say, then, the question arises as to the mode in which the indication is to be carried out.

I am firmly convinced that, should I be called this day to the conduct of such a case, I should feel bound by my conscience to recommend a delivery by a gastrotomy operation. I cannot think that a cleaned incised wound along the linea alba, sufficient in length to permit the extraction of the child from the peritoneal sac, however exceptionable in itself merely considered, can be held in the least degree objectionable when compared with the delay, the fatigue, the contusion, and the renewal of the suspended hemorrhage, that would inevitably attend an attempt to extract *per vias naturales*. I express this opinion here, upon a most vivid recollection of the distress which I occasioned to an unfortunate woman, who in consequence of a laceration affecting the posterior wall of the vagina and the vaginal cervix, drove her child into the cavity of the belly. As the head could be Touched, and as the child was dead—nearly twenty hours having elapsed since its escape from the uterus—I made use of the perforator, and then, taking hold of it through the opening, with my embryotomy forceps, I used all the force which it was possible for me to employ in drawing it away through the natural passages. The unfortunate woman, who bore the rude operation with the greatest constancy and courage, lingered many hours after its close. The events of this case, which, peradventure, might have had a happier conclusion by means of the gastrotomy operation, have impressed me, more than a thousand arguments could do, with a deep conviction of the cruelty of such a mode of delivery; and I repeat here, in the most distinct terms, my decided preference for a delivery by means of an incision through the linea alba.

CHAPTER XV.

OF THE FORCEPS.

"But yf all these medicines profite not, then must be used more severe and hard remedies, with instruments, as hokes, tongues, and such other thynges made for the nonce. And fyrst, the woman muste be layde along upright, the middle part of her bodye lying hier then all the rest, companyed with women assisting her about, to comfort her and to kepe her downe, that when the byrth is plucked out she rise not withall. Then let the Mydwyfe annoynt her lefte hande with the oyle of white Lillies, or other that may make it soople and smothe, and holding out her fingers, shutting together her hand, let her put it into the Matrix to feele and perceyve after what fashion the dead byrth lyeth in the Mother's wombe, so that she may the better put in hookes and such other instruments to plucke it out withall."

"Yf it be that it lye the head forwarde, then fasten a hooke eyther uppon one of the eyes of it," &c. &c.

The above quotation from the "Woman's Booke, or the Byrth of Mankynde," may serve to show the Student what was the notion of Midwifery in the glorious age of Queen Elizabeth. Thomas Rainald, the author of this quaint old English, is the earliest vernacular author on Midwifery. The volume from which I have made the extract was "imprinted London, 1565," 4to. It consists chiefly of a translation from Rhodion. Let the Student be thankful for the age in which he lives. He is not foreordained to the use of hooks and other such instruments in difficult cases, for, in modern times, the resources of the obstetric art have been signally augmented by the discovery, and the great perfection attained in constructing and using instruments for the forced delivery of the parturient woman. The ancients were not wanting in numerous inventions for expediting the birth of children, but, unhappily, all their instruments were constructed with the sole view and intention of being useful to the mother, and had no applicability to the child, except to extract it after depriving it of existence, or even to draw it forth from the womb still palpitating with life, and presenting the most shocking spectacle of mutilation and distress. The *Uncus*, or Crotchet, described by Celsus, continued, indeed, to be the model of obstetric instruments down to the close of the seventeenth century, when a happy thought resulted in the construction of an apparatus most perfectly adapted for the security both of mother and child, and which, at the present day, and in the hands of skilful and well-instructed persons, may be considered one of the greatest triumphs of art in behalf of suffering humanity.

Perhaps one of the ideas that would most readily and spontaneously present itself, in a case of difficult labor with a head presentation, would be to take hold of the head and draw it forth; and I believe that most of the good women who so assiduously apply themselves to exhort us to help our patients, actually do believe that we can take hold of the child's head with our fingers, and draw it into the world, as readily as we can draw a dollar out of our purse, or take an apple from a basket. But we cannot take hold of the head and pull it down, simply because we cannot grasp an infant's head in the hand: we can apply our fingers to one side, and a thumb to the other side, and press it between them; but when we attempt to pull the head down, we find that the fingers and thumb are not long enough to admit of our *grasping* it; and we withdraw the hand, leaving the head just where it was before we made the attempt, and the woman so much the worse for the additional irritation of her organs.

This attempt, during the lapse of centuries, must have been made many thousands of times, and always with the same unsuccessful result; and the idea of extracting it with a pincers or forceps sufficiently large to grasp the head, must also have presented itself for ages; but how to apply the forceps? A straight forceps could not grasp the head, it would slip off from the head as if it was wedge-shaped; while to make the forceps curved, so as to grasp the head, would make it impossible to introduce it, since the forceps must first enter into the genital fissures, and then expand considerably to pass over the parietal protuberances so as to grasp the head when carried upwards far enough. It could not expand sufficiently to go over a head large enough to occupy with its own bulk the entire capacity of the excavation. Such, in fact, was the forceps of Palfyn, and such must have been the instrument spoken of by some of the Arabians. No forceps that could be got on to the undelivered head had been discovered; and in all cases, where the child could not be pushed back and turned, or where the head became permanently arrested, the medical people were obliged either to let the mother and her offspring perish together, or they unscrupulously sacrificed the child, to insure the escape of its parent. Our ancestors consoled themselves with a quotation from Tertullian to the following effect: "*Atquin et in ipso adhuc utero, infans trucidatur necessariâ crudelitate, quum in exitu obliquatus denegat partum matricidus qui moriturus.*" Barely to look over some of the plates representing the obstetric instruments employed previously to the discovery of the modern obstetric forceps, is sufficient to produce a shudder in any one familiar with the difficulties met with in parturition; and the griffin's claws, sharp crotchets, and *tire-têtes*, which were the boast of their inventors in a barbarous age, serve but to set forth more signally, by comparison, the eminent usefulness of the modern instrument, to which we are indebted for our own escape from the necessity of employing such means as were very familiar and commonplace with our predecessors.

The great desideratum in Midwifery was a forceps that might seize the head and extract it, without inflicting a wound; and we are indebted for it to a Doctor Paul Chamberlen, who practised midwifery in England towards the close of the sixteenth century. He constructed, probably with his own hands, two curved pieces of iron, which, being introduced separately, were applied in succession to the left and right sides of the head, and then united by a pivot joint, by means of which the two separate pieces were converted into a pincers, or forceps, the handles of which crossed each other at the pivot or joint, and thus the blades became capable of grasping and firmly holding the oval-shaped head of the child, while still contained in the womb or vagina. As the handles crossed each other, and were secured by the pivot, which passed through a drilled or mortised hole in the handles, it followed that, when the outer extremities or the handles were pressed towards each other, the head was firmly grasped betwixt the blades or clams. The compressing or holding force being duly applied, a sufficient degree of extracting power enabled the Surgeon to draw the head forth from the passages, and the child was born without necessarily experiencing the smallest injury. In inventing this instrument, Chamberlen happily combined the ideas of a *cochlea* or blade, a *junctura* or lock, and a *manubrium* or handle; and it is surprising, seeing how simple, how manageable and powerful is the apparatus, how beneficent and therein desirable, that so many centuries were allowed to pass over the records of medicine before the discovery of this method of conducting difficult labors with safety to the child. For centuries, the perforator and crotchet were the mother's instrument. The child's instrument, or forceps, was reserved to honor the seventeenth century by its revelation.

This great discovery, the essential value of which is known only to medical men, would have entitled its author to the everlasting gratitude of his fellow-creatures, had he not tarnished his fame by shamefully making a secret of what ought to have been instantly promulgated for the general use of all who should stand in need of its merciful intervention. But the spirit of the age, or a venal spirit of his own, induced him to confine his secret to his own breast, to be communicated, at length, only to his sons, who were instructed in the mode of its use, and who are supposed to have drawn large profits from the necessities of the unfortunate women who, aware of their superior skill, were compelled to seek for safety at their hands only.

Little is now known of these persons except their names; and they have deservedly sunk into the comparative oblivion that ought to overtake all those who, whether by accident or by the possession of genius, come into the enjoyment of facilities that ought to be the common property of humanity, but who, instead of divulging them, and spreading their use and employment as far as the want of them extends, are induced by a sordid thirst for gold to retain them within their own hands, and sometimes inhumanly permit the secret to perish with them, rather than give it all the publicity and currency which its importance entitles it to. Such is the spirit of quackery or empiricism, under whatever guise or in whatever art; and the fate of the Chamberlens, whose history is almost forgotten already, is but a just retribution for their base reservation of so valuable a secret.

There is a very curious and interesting case related by Mauriceau, in which he informs us that Hugh Chamberlen, one of the sons of the inventor, went to Paris in 1670, with a view to sell his secret to government, and while there, boasted in the most confident manner of his ability to deliver any woman, in any labor, no matter how difficult, in half-a-quarter of an hour. It happened, at the time, that a woman with a deformed pelvis fell into labor, who, after vain attempts to deliver her, was put into Chamberlen's hands. He undertook the management of the case with the utmost boldness, but, after a cruel perseverance of three hours, was compelled, through sheer fatigue and exhaustion, to give it over, confessing his inability to effect the delivery. The poor woman perished shortly after his retreat, and her body being examined, it was found that he had lacerated the womb and vagina in various places with the points of the forceps. Mauriceau was so disgusted with the issue of this affair, that he afterwards inveterately opposed the use of such instruments; while Chamberlen immediately returned to England, where he drew very large receipts from the practice of Midwifery in London.

Inasmuch as Chamberlen's preface to Mauriceau's work on the diseases of women with child and in child-bed is exceedingly rare, and particularly so in the United States; and notwithstanding my detestation, before expressed, of his wicked conduct in concealing his invention, I deem it proper to republish in this work his address to the readers of his copy of Mauriceau. It is but a proper contribution to the literary history of Midwifery, which I am sure that my readers will not be sorry to possess. The following are his words:—

"Having long observed the great want of necessary directions how to govern women with child, and in child-bed, and also how new-born babes should be well ordered, I designed a small manual to that purpose; but meeting, some time after in France, with this treatise of Mauriceau, (which, in my opinion, far exceeds all former authors, especially Culpeper, Sharp, Speculum Matricis, Sermon, &c., being less erroneous, and enriched with divers new observations,) I changed my resolution into that of translating him; whom I need not much commend, because he is fortified with the approbation of the wardens of the Chirurgeons Company of Paris.

"His anatomy was in the first edition omitted, but is in this; which, with the book, I have carefully rendered into English, for the benefit of our midwives; of whom many may yet very well admit of an additional knowledge. The principal thing worthy their observation in this book is, accurately to discover what is properly their work, and when it is necessary to send for advice and assistance, that so, many women and children may be preserved that now perish for want of seasonable help. My author makes out the breaking of the right waters, for the proper season of a natural delivery, and whenever a child is not born then, or soon after, nature is so much short of performing her office. This is certainly a great truth; and all wrong births should never be longer delayed: and for the most part floodings and convulsions not so long, lest the woman lose her life before ever the water breaks; but if no dangerous accident intervene, in a right labor, one may lengthen out their expectation to twelve hours after; and though some may have been happily delivered twenty-four hours, or two days after, yet I should not advise any to run that hazard, provided they can have an expert artist to deliver them, without destroying the child; because many have perished in that case; and it is not prudent to venture, where but one of many escapes. For the longer the labor continues after the breaking of the waters, the weaker both woman and child grow, and the drier her body, which renders the birth more difficult; and 'tis ever good taking time by the foretop.

"And that midwife's skill is certainly the greatest, and she deserves most commendation, who can soonest discover the success of the labor, and accordingly either wait with patience, or timely send for advice and help. Nor can it be so great a discredit to a midwife (let some of them imagine what they please) to have a woman or child saved by a man's assistance, as to suffer either to die under her own hand although delivered. For, that midwife mistakes her office that thinks she hath performed it, by only laying the woman; because her principal duty is to take care that she and her child be well, with safety and convenient speed, parted; and if this be impossible for her and feasible by another, it will justify her better to waive her imaginary reputation, and to send for help to save the woman and child, than to let any perish, when possible to be prevented; as in the case of my author's sister, and in the twentieth chapter of the first book. Yet, in countries and places where help and good advice is not seasonably to be had, midwives are compelled to do their best, as God shall enable them; which dangerous and uncertain trials it doth not become them to put in practice upon women, where no timely assistance need be wanting. Most wrong births, with or without pain; all floodings with clods, though little or no pain, whether at full time or not; all convulsions, and many first labors; and some others, though the child be right, if little or no pain, after the breaking of the waters, and the child's not following them in some six or ten hours after, require the good advice of, and, peradventure, speedy delivery by expert physicians in this practice; for though a few may escape in these cases, yet the far greater number perish, if not aided by them. Let me therefore advise the good women, not so readily to blame those midwives who are not backward, in dangerous cases, to desire advice, lest it cost them dear, by discouraging, and forcing them to presume beyond their knowledge or strength, especially when too many are over-confident.

"Those few things wherein I dissent from my author, if of dangerous consequence, are noted in the margin; if not, are left to the discretion of the reader.

"I confess he is often too prolix; a fault which the French much affect; however, I chose rather to translate him according to his own style, than contract him; and also to leave unaltered some things not very well expressed, being of small moment. I find also he distinguishes not between the words *plaister* and *ointment*, but uses them promiscuously one for the other.

"In the seventeenth chapter of the second book, my author justifies the fastening hooks in the head of a child that comes right, and yet because of some difficulty or disproportion cannot pass; which I confess has been, and is yet the practice of the most expert artists in midwifery, not only in England, but throughout Europe, and has much caused the report, that where a man comes, one or both must necessarily die; and is the reason of forbearing to send, till the child is dead, or the mother dying. But I can neither approve of that practice nor those delays; because my father, brothers, and myself [though none else in Europe as I know] have, by God's blessing, and our industry, attained to, and long practised a way to deliver women in this case, without any prejudice to them or their infants; though all others (being obliged, for want of such an expedient, to use the common way) do, and must endanger, if not destroy one or both with hooks. By this manual operation, a labor may be dispatched (on the least difficulty), with fewer pains, and sooner, to the great advantage, and without danger, both of women and child. If therefore the use of hooks by physicians and chirurgeons be condemned (without thereto necessitated through some monstrous birth), we can much less approve of a midwife's using them, as some here in England boast they do; which rash presumption, in France, would call them in question for their lives.

"In the fifteenth chapter of this book, my author proposes the conveying sharp instruments into the womb, to extract a head, which is a dangerous operation, and may be much better done by our fore-mentioned art, as also the inconvenience and hazard of a child dying thereby prevented, which he supposes in the twenty-seventh chapter of this second book.

"I will now take leave to offer an apology for not publishing the secret I mention we have to extract children without hooks, where other artists use them, viz., there being my father and two brothers living, that practise this art, I cannot esteem it my own to dispose of, nor publish it without injury to them; and think I have not been unserviceable to my own country, although I do but inform them that the fore-mentioned three persons of our family, and myself, can serve them in these extremities, with greater safety than others.

"I design not this work to encourage any to practice by it, who were not bred up to it; for it will hardly make a midwife, though it may easily mend a bad one. Notwithstanding, I recommend it to the perusal of all such women as are careful of their own and their friends' safeties, there being many things in it worth their noting: and designing it chiefly for the female sex, I have not troubled myself to oppose or comment upon any physical or philosophical position my author proposes. I hope no good midwives will blame me or my author for reprehending the faults of bad ones, who are only aimed at, and admonished in this work; and I am confident none but the guilty will be concerned, and take it to themselves, which I desire they may, and amend. Farewell.

"HUGH CHAMBERLEN."

I shall seize this occasion to remark that, while the forceps consists of the cochlea, the junctura, and the manubrium, the instrument consists essentially in the cochlea or clamp, and that all inventors, and other persons who may project something better than any of the obstetric forceps now known to the profession, ought to bend the whole force of their art or genius to the improvement of the cochlea; since the junctura and the manubrium are matters of minor importance. To see the ridiculous attempts at improvement displayed in Mülder's work and others, is to convince one that most of the projectors regarded the handle or else the joint as the thing, and wholly overlooked the cochlea, which, after all, is what we want, and which, being of a good form and fabric, makes it a very indifferent matter how the lock and handle are arranged.

The father of the above-mentioned Hugh was Dr. Paul Chamberlen, who had also for his son Dr. Peter Chamberlen, the one of which Hugh speaks in the preface to his translation of Mauriceau. There must have been another; since Hugh Chamberlen, in his preface above, speaks of his father, his *brothers*, and himself. The name of one of the brothers appears, therefore, to be lost.

There are now in England specimens of the Chamberlen forceps, which have been recently discovered in an old box, concealed beneath the floor of a country house formerly owned by the Chamberlens, at Woodham Mortimer Hall, in Essex. They have been described by Mr. Causardine, in *Med.-Chir. Trans.*, ix. 183, into whose possession they came, and who had the good sense to present them to the Museum of the Royal College of Surgeons, London. There is the greatest reason to suppose that these specimens are instruments really made by the Chamberlens themselves, and that the collection shows their progress in the invention, improving the apparatus at each successive attempt, until in one of the instruments they have succeeded in obtaining a really valuable form.

Being in London, in May 1845, I was greatly obliged by the kind assistance of Prof. Ed. W. Murphy, of University College, who not only procured permission, but caused Mr. Coxeter, the cutler, to make *fac-similes* of the Chamberlen instruments for me, of which I here present faithful drawings. These drawings are five in number.

Fig. 120 is an extremely well-formed vectis, with a blunt crotchet at the end of the handle; the opening or fenestra is well represented in the drawing, which is from my camera lucida. The figure cannot represent the head-curve of this vectis, which is faulty in consequence of the slightness of that curve: still, it is an instrument of which one might make a fortunate use in a case of labor requiring nothing more than the vectis. The form of the hook at the other end of the handle, and the sharpness of its point, though they may perhaps entitle it to the character of the blunt-hook, might leave one, upon a narrower examination, under the impression that the Chamberlens must have employed it rather as a sharp crotchet than as a modern blunt-hook.

Fig. 120.

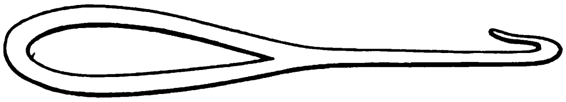
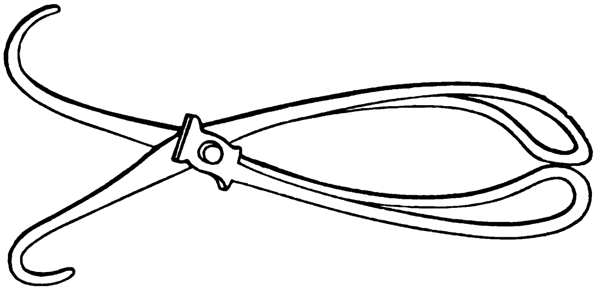


Fig. 121 represents, probably, the second attempt of the inventor to carry out his happy idea of the obstetric forceps; it consists of two separate pieces, both terminated by blunt hooks at the handles; both possessing the old curve, and capable, therefore, of grasping the head, when once applied to it while lying within the genital passages. I say separate pieces, since the two pieces may be taken apart by unscrewing the pivot, which in the figure is seen passing through the lock. The right hand branch was forged out of one piece of iron, like the vectis at Fig. 120; but the left-hand branch was a piece of thick iron wire carried out to the extremity of the clam, and then re-

Fig. 121.



turned towards the lock, where its extremity, being flattened, forms the square head for the reception of the screw-pivot.

If this instrument, as I suppose, does really represent Chamberlen's second attempt at invention, it must be regarded as a remarkably successful effort; for, setting aside some imperfection in the amount of the old-curve or head-curve, it presents us with an apparatus, a true obstetrical forceps, of which the counterparts, being separately introduced and then locked by screwing in the pivot, may be so perfectly adjusted upon the fœtal cranium as to give the operator complete power over it. The fenestra is very good: the curves, however, are extremely faulty. Not so with the forceps, Fig. 122, which is in all respects an admirable instrument as to the head-curve, as may be seen by inspecting it in the drawing. The iron of which it was forged is, it is true, rather clumsy and heavy, but scarcely more to be condemned, on that account, than the heavy Berlin forceps of Professor Siebold. It had no pivot-joint, but the two compartments were fastened together by a strong flat braid, like that represented in the figure, which, being passed through the hole drilled in the lock of the instrument, and afterwards wrapped around the handles, would serve, after the adjustment of the blades upon the head, to hold it quite securely, and prevent even as much rocking motion as attends the use of the common English joint.

Fig. 122.

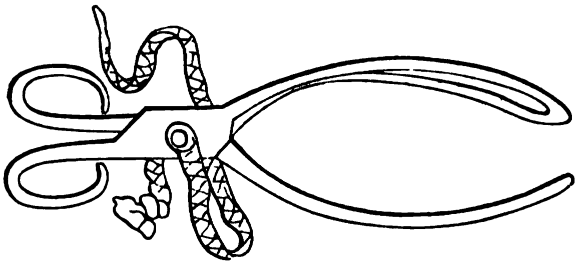
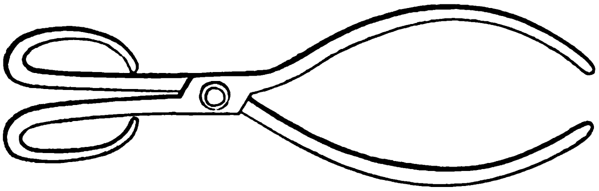


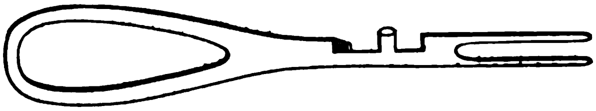
Fig. 123 shows the last and most perfect form of the obstetric for-

Fig. 123.



ceps of the Chamberlens. It has what is now called the German lock; for the left-hand blade, or male blade, or lower blade, for these are synonymous terms, is provided with a fixed pivot, to receive upon it the female or upper blade, as may be seen at Fig. 124, in which the pivot is represented, the handle being terminated by the bending upwards of the iron.

Fig. 124.



I have never delivered a woman with one of these old Chamberlen instruments, and while I should much prefer an instrument made by a modern artist to either of these early specimens of the invention, I would not hesitate in any case, where the vertex was at the pubal arch, to employ either Fig. 122 or 124, if my Davis's forceps was not at hand. The instrument is scarcely inferior to the Haighton forceps, in use in England at the present day.

In 1733, Dr. Samuel Chapman published a "Treatise on the Art of Midwifery," &c., in which the forceps of the Chamberlens was given to the world; and from that time to the present day, it has undergone many modifications of form and size, and mode of coaptation: almost every distinguished practitioner or writer selecting some particular fashion as most in accordance with his especial views.

The instruments first employed had only one curve, that which applied itself to the head of the child in order to grasp it—and this is called the Old-Curve; it ought to be called the Head-Curve—so that a front view of it represents it as a straight instrument. Such a fashioned instrument could be easily applied to the head whenever it had descended quite into the excavation, or whenever the ear could be touched by the point of a finger introduced into the vagina. But in all cases where the head was arrested while in the superior strait, a forceps possessing only the old or head-curve could not well be employed in its extraction, because the pelvis is itself curved, and hence when the points of the instrument should have mounted up sufficiently far to be on a level with or above the plane of the superior strait, the handles would necessarily press the edge of the perineum back too much towards the point of the coccyx. This pressure is both hazardous and painful, and endangers an early contusion of the perineum, or even its laceration. To effect such an adaptation would in all cases be found difficult, and, in cases of rigid perineum, quite impossible.

From the period of the publication of this invention by Dr. Samuel Chapman, up to the middle of the seventeenth century, several new forms, deserving perhaps to be called improvements, were offered to the profession. For a history of these various modifications, which it is not necessary for me to present in this work, I refer the Student to Dr. Mülder's *Historia Literaria et Critica Forcipum et Vectium Obstetriciorum*, in which he will find very accurate drawings of a great multitude of forms and dimensions of obstetrical instruments, down to a late period in the history of that apparatus. To look at Mülder's account is enough to excite a smile in the reader at the ambition which proposes to build up a solid reputation rather by spoiling than by improving an implement already perhaps perfect.

Professor Asdrubali, in his *Trattato Generale di Ostetricia Teoretica e Prattica*, vol. iii. p. 180, refers to Professor Manni's examination of the history and properties of the obstetric forceps, and he says: "Dopo questa correzione portata nel forcipe degli Ostetrici di Londra e di Parigi circa la metà del passato secolo, parea questo stromento giunto alla sua perfezione, ma lo spirito umano, sempre irrequieto più per l'ambizione di distinguersi, che per giovare ai suoi simili, ne mise fuori una serie numerosa dei già riprovati, e talvolta più meschini di quelli." And he names the forceps of Loder, Galletti, Santarelli, Steidele, Johnson, Orms, Denman, Smith, Lowther, Osiander, Eckard, Stark, Bush, Siebold, Thenance, Du Bois, Mursinna, and Brunninghausen; and concludes that all these modifications do not exhibit any real improvement upon the forceps of Smellie and Levret.

Dr. Smellie of London, and Dr. Levret of Paris, both conceived at about the same period, that is about the year 1745, the idea of giving to the blades a new curve on the edges, so as to adapt them to the axis of the superior as well as to that of the inferior strait; and accordingly they produced the forceps with New Curves, which are almost universally in use at the present day. Smellie used for common purposes his short straight forceps, fearing that too general and indiscriminate an employment of the long curved one might prove mischievous; while Levret recommended his long and powerful instrument as being equally adapted to all cases proper for forceps-operations. Smellie's instrument was united by the reciprocal notch, called the English joint or lock, and Levret's was joined by a pivot and mortise, with a sliding plate, to secure it when united. Both the instruments were provided with fenesters, but of an insufficient size to do much more than serve to render them lighter.

The French forceps, somewhat modified by Pean, has great vogue in this country at the present time, under the denomination of the Baudelocque forceps. It is two inches longer than Levret's, and is constructed without the bead or raised line that runs around the inner or fœtal face of the clamps, and which, besides being useless, was found inconveniently to cut or contuse the scalp of the infant.

The obstetric forceps consists of two pieces or branches, a right-hand and a left-hand one, intended to be introduced separately between the sides of the head and the parts in which it is contained; but always so adjusted as to let the concave edge of the new curve look towards the front of the pelvis, to suit the curvature of which, it was originally contrived or invented. The part that is called the blade or clamp, the COCHLEA, ought always, if prudent, to be applied on the side of the head, and not on the crown or occiput, and the extremity of the clam should reach up at least as far as the chin. Hence, in constructing a forceps, it should be always considered necessary to make the clam, or blade part, sufficiently long to reach at least from the child's vertex to its chin; a distance of about five inches in the uncompressed state of the head, but which is much increased in some cases where the head is subjected to severe and long-continued compression in the passages. But while the head itself requires that the clams of the instrument should be five inches long, the different positions or situations in which the head is found at the time the forceps becomes necessary, demand that there should be given to the instrument length enough to embrace the head, whether it be high or low in the pelvis; and that, in introducing them, the lock or joint, the JUNCTURA, should not be carried within the orifice of the vagina.

There must also be a handle, manubrium, of sufficient length and strength to admit of its being used with facility by the operator. The forceps therefore is divided into the blade or cochlea, the junctura or lock, and the manubrium or handle. The proportion of these several parts has been adjusted in various ways, according to the taste or judgment of the several makers of them. Dr. Smellie, who generally employed his short, straight forceps, constructed them of the length of eleven inches, while to his long-curved forceps he gave a length of twelve and a half inches.

The French or Baudelocque forceps, in very general use in this country, is a powerful instrument. The specimen that I have before me, and which is made by Messrs. Rorer, is exactly eighteen inches in length, the pivot or joint being very nearly midway between the end of the clamps to the end of the handle. The ends of the clamps approach within three-quarters of an inch when the handles are closed or pressed together, while the greatest distance between the clamps is not quite two inches and a half. The blade or clamp has an open fenester which is not quite an inch wide at the widest part, but which is six inches long, growing narrower as it approaches the lock, where it is not three-tenths of an inch in width. The lock or joint consists of a pivot in one branch, and a notch in the other. The pivot is fixed into its own blade by a screw, the top of which is a thumb-piece, by means of which it may be screwed into or withdrawn from its place. The notch in the other blade is adjusted so as to receive the pivot into the left or outer side of the instrument, and the top of the notch, being countersunk, receives a conical shoulder at the bottom of the thumb-piece of the screw, by which means it is made perfectly secure against any motion except that of opening and shutting the instrument. The end of each of the handles is curved outwards, so as to make a blunt-hook, that may, upon occasion, serve all the purposes for which the blunt-hook is used in Midwifery. The weight of the specimen is two pounds and seven-eighths of an ounce.

This powerful instrument, in skilful hands, may be made use of to overcome very great obstacles; but, in careless or unskilful application, may be the cause of great mischief. It has been objected to by many prudent persons on account of the great weight of metal, and the severe pressure of the child's head, that may, almost unconsciously by the operator, be made with it. The late Dr. James very rarely used any other than a short-handled straight pair, called Haighton's forceps: yet I have had occasion to witness the application, by him, of a pair modelled upon the plan of the Baudelocque forceps. It cannot be doubted that all the benefits of the small forceps may be obtained in the use of the large ones; and those who cannot conveniently command a variety of instruments would do well to familiarize themselves with that which I have above described. It has been well remarked by Baudelocque, that it is not so much the instrument that is to be looked to, as the hand that uses it.

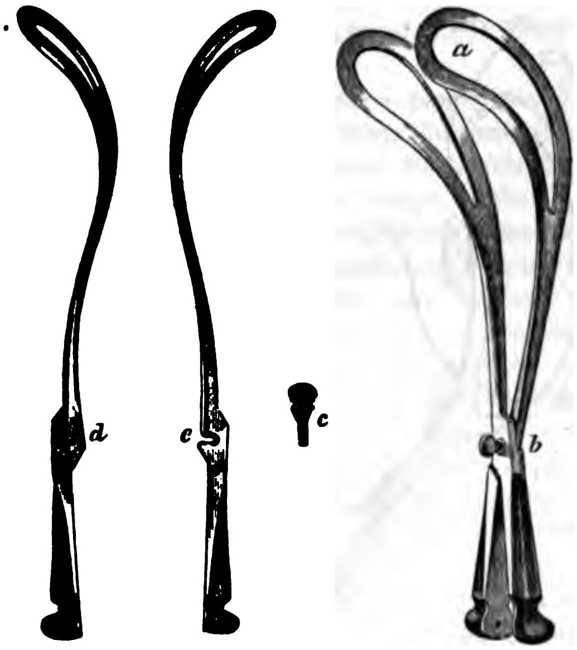
The most convenient forceps that I have ever employed, and that which I commonly make use of, is the instrument recommended by the late Professor Davis, of the London University.

The instrument now before me is the one described in Davis's *Operative Midwifery*, and was made under his direction for me by the late Mr. Botschan of London. It weighs ten ounces and three-quarters, and is in length twelve inches; its lock is the English lock, composed of a notch in the upper surface of the left and in the lower surface of the right-hand branch. When the handles are closed, the ends of the clamps are seven-tenths of an inch apart, while the fenesters, at their widest part, are two and three-quarter inches asunder. The broadest part of the fenester is equal to two inches, while its whole length is five inches. From the extremities of the handles to the lock or point where the branches cross, is four and a quarter inches. After the branches are crossed, they do not divaricate, but proceed in parallel lines one inch and a quarter: hence, if a fœtal head be ever so considerably elongated by the pressure of the parts, the clamps are sufficiently capacious to contain it, being seven inches long. In this instrument, such are the width and length of the fenestræ, that a large part of the parietal protuberances jut out through or beyond them when they are fixed on the head. Indeed, the fœtal head, when held within the grasp of this instrument, if it be properly adjusted, can hardly sustain any injury from it, so admirably is it modelled upon the curves of the cranium.

I have several times delivered from the superior strait with Davis's forceps, an operation for which it is peculiarly well adapted by the boldness of the new-curve, particularly upon its convex or inferior edge. There is no forceps extant of which the new-curve so nearly coincides with an arc of Prof. Carus's circle. I am quite free to confess my preference for this over all other instruments for the safe delivery of the child, because, as I repeat, I think it almost out of the bounds of possibility to injure the fœtus with it, provided it be perfectly well adjusted, and used with common discretion. I have not myself employed the German forceps of Siebold, because I have considered that the handles are very clumsy, and so widely separated, when the instrument is adjusted on the head, as to expose us to the hazard of compressing the cranium too violently. I have also thought the handles too much curved. But the author of the instrument is justly celebrated for his skill; and I am also aware that this is the instrument preferred and often used in our city by Dr. R. M. Huston, whose judgment and skill demand my highest respect. This gentleman, who is frequently called upon for consultation, has informed me that his success with Siebold's forceps, modified by himself, causes him to esteem it above all others. It ought to be observed that Dr. Huston's forceps, although modelled upon that of Prof. Siebold, is very different from it in regard to its lightness and manuability, in consequence of the great length of the lever. This is, perhaps, a fault, if it be true, as I believe it to be, that the obstetric forceps is not a compressor, but only a tractor and double lever. Shorter handles, which lessen the power of the lever, diminish the hazards to which the child is exposed from the compressive action of the instrument, which in all cases perhaps is too fearfully great. Short handles do not prevent us from holding the child securely: with short handles it is possible to make traction to an extent that is dangerous. My specimen of Siebold's forceps, manufactured at Berlin, weighs twenty-seven ounces and a half, while the instrument of Dr. Huston is but twenty-one ounces in weight.

Fig. 125 is a representation of this forceps modified from Siebold's, which I have taken from Huston's edition of Churchill's *Midwifery*.

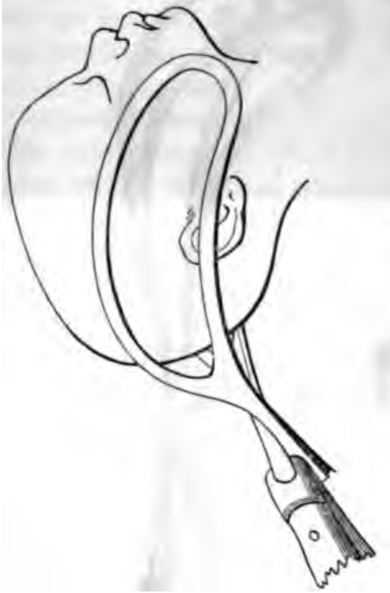
Fig. 125.



Upon looking along the convex edge of the new curve of Huston's forceps, it will be seen that the line is almost straight from a point a little beyond the posterior terminus of the fenestral opening, to the handle, so that the instrument is more seemingly than really curved—for the instrument, strictly speaking, is the clamp. The clamps are not very much bent, especially the concave edge of the new-curve.

I subjoin here a drawing, Fig. 126, taken in the camera lucida, of my Davis's forceps made by Botschan, applied to the head of a child. It will be seen by inspection of the concave edge of the new-curve, that that edge is not very much bent, while the convex edge of the curve represents almost the quadrant of a circle; and as the convex edge turns upwards to join the handle, which springs mainly from the concave edge, and is continuous therewith, it follows that, when the instrument is introduced into the cavity of the pelvis, it rests easily therein, because it does not strain back the anterior edge of the perineum towards the anus, and even near to the point of the coccyx, as must happen when the head is seized high up in the pelvis with any other instrument. The edge of the perineum, in using this instrument, comes forward almost as far as the line which is continuous with the concave edge of the curve. The great advantage attending the use of Davis's forceps is found in its lightness, weighing, as I said, ten ounces and three-quarters, and in the shortness of its handles, which, while they afford all the requisite purchase for making even the most powerful and dangerous traction, yet from the shortness of the lever, serve to guard the child against the mischiefs of excessive compression.

Fig. 126.



I now reiterate the expression of my opinion that the obstetric forceps was never designed to act as a compressor, but only as a tractor and double lever. Dr. Davis's forceps is forged in such fashion that its interior face is perfectly adapted to the rotundity of those parts of the head which it touches; while the fenestræ are so vast as to permit considerable portions of the parietal protuberances to project as segments of curves outside and beyond the fenestral openings. It would be true to say that the instrument, when accurately adjusted upon the sides of the cranium, scarcely touches the maternal tissues within the pelvis. The exterior curves are also arranged so accurately that the tissues of the mother can never touch the edges of them; so that they cannot be cut by them, the surfaces of contact being everywhere broad and gently rounded. The admirable form of the old-curve or head-curve enables the instrument to touch very large portions of the cranial surfaces, pressing them equably, and not unequably: so much so, indeed, that, when the instrument is accurately applied, it would be a very difficult matter to do with it the least injury to the fœtus, since it can scarcely slide. I prefer it for ordinary cases to all the other instruments.

Each blade of this forceps is provided with a supplementary counterpart much narrower than the principal blades, which may often be usefully resorted to in cases where, after easily adjusting the first blade, the apposition of the second blade is found to be difficult, dangerous, or impossible, in consequence of that portion of the head which the blade ought to cover, being driven or jammed with violence against the bony side of the pelvis. Under such circumstances, a narrow blade might admit of adjustment, whereas a broad one could by no means be with safety applied.

I fervently desire the Student to have a proper idea of the meaning and intention of the accoucheur in using the obstetric forceps. His course as a practitioner will take its color much from the impressions he receives concerning the nature and design of the instrument. If I were possessed of such place and reputation in the world as might give to my opinion any character of authority, I do not know in what manner I could exercise such authority more favorably to the interests of humanity, in this particular line, than by establishing thé doctrine that the obstetric forceps is the child's instrument; that the perforator, the crotchet, and the embryotomy forceps, are instruments for the mother; and that the Cæsarian operation is an operation to be performed for the benefit of the parturient woman.

If a woman in labor is in a situation demanding immediate delivery by instrumental means, and that without any reference to the claims or interests of the child, it is clear that, to lessen the volume of the cranium by perforation, and to extract it with the crotchet or with my embryotomy forceps, is the safest as well as the swiftest method that can be employed; and every accoucheur would prefer this method in a case exhibiting undeniable proofs of the death of the fœtus. Hence I repeat that the obstetric forceps is designed to save the child, and that the relief which it gives to the mother is but an appurtenant to it.

It is true that, in the conduct of a labor, the accoucheur shall often come to the conclusion to deliver with the forceps on account of some excessive pain, inability, or danger, to which the woman is exposed;

and this in cases where he would not adopt such a resolution from views relative to the safety of the child alone.

In this sense, then, the Student might reply that the forceps is the mother's instrument; to which I answer, nay, but it is the child's instrument; and I select it for my operation only because it makes the child safe, which could not be were I to use the mother's instruments—to wit, the perforator and the embryotomy forceps. I dare not to use the mother's instruments in contravention of the rights of the child, but I may with the child's instrument relieve the mother, and save her, while I do it no injury.

If the Student should take his impressions of duty from studying the English books of midwifery, he will go into the world believing that the obstetric forceps is the mother's instrument, and he will use it for her, and for her alone; whereas, should he adopt the views above set forth, and which I deem to be perfectly sound and wholesome, he will enter upon his career feeling and knowing that he possesses an apparatus with which to rescue the child when in danger; and he will employ this instrument as often from indications relative solely to the child, as from indications relative solely to the mother; and, if the American Student should take this view, he would, *cæteris paribus*, become a better accoucheur than the European, particularly the English Student, who, it seems to me, does not know more clearly than Chamberlen himself did, that the forceps is really designed for the rescue of the child. He will save more lives; for he will rescue many an infant that but for such intervention would be still-born; and he will save many a mother, who in England is allowed to test the spontaneous power up to a point at which embryotomy becomes indispensable, as a means of saving the mother, a point from which she too often begins irrecoverably to sink.

The obstetric forceps is designed to be applied only to the cranium of the child. It should never be applied to the pelvic extremity of the fœtal ovoid.

The blades are designed to be applied to the sides of the head, the extremities of them passing up nearly as far as the chin. See again Fig. 126. They may be applied to the head in occipito-anterior and in occipito-posterior positions of it, and also in the transverse positions which it sometimes assumes. They may also be applied to the head in face presentations, whether the chin be to the pubis or to the sacrum; and their consummate conservatism must be frequently appealed to, for the succor of the child, in those pelvic presentations in which the head cannot be extricated by the hand alone.

When properly adjusted in a suitable case, they give to the surgeon control at will over the progress of the labor.

I have said that the forceps is not a compressor, but merely a tractor. I might have said that, while it is a tractor, it is also a double lever.

In order to get a good idea of the lever-like action of the forceps, let the Student endeavor to deliver the fœtus on the machine; and, for this purpose, let him employ a Baudelocque or French forceps. Having grasped the head, let him take hold of the blunt-hook of the left-hand branch, and pull by that alone; and, as he pulls, very gently, let him move the hook towards the left side; and having carried it far enough over in that direction, let him take hold of the blunt-hook of the right-hand branch, and pulling gently, or even by merely holding on enough to keep the clam of that branch from sinking into the pelvis, if he carries the handle over to the right side, he will find what is meant by, and what is the great and efficacious power of the lever-like operation of the forceps, when moved, from handle to handle; for, as he carries the said hook to the right, the blade of the other half of the forceps will be seen to emerge from the pelvis; and so, by alternating the lever-like motions, he will at last find that the forceps is withdrawn wholly from the pelvis, bringing away in its clamp the head of the young child unhurt by compression.

The compressive action of the instrument is not needed, further than to cause it to hold the head firmly and steadily, while the lever or lateral, and the extracting or vertical power is applied through it. It is never applied to the fœtus in breech or footling cases, until all parts of the child save the head, are born, for the delivery of which, under such circumstances, it is frequently required; nor can it ever be required in those presentations which are manageable by the hand, the noose, or the blunt-hook.

One of the most dangerous errors relative to the forceps that a Student could take up, would be the opinion that the forceps is, in its very design, a compressive instrument. It is not so; the forceps is not a pincers, it is an extractor—it is a real *tire-tête;* and I think it ought to be established as a principle in obstetrics, that, where there is not space enough for the descent of the head without the forceps, there cannot be produced a due proportion by merely squeezing the head down to the required dimensions by such an instrument. If, however, the Student will hold such a disproportioned head firmly with the cochlea, and draw it downwards, the pelvis and the tissues will wire-draw it so as to enable it to pass the before too narrow apertures or canal. An ounce of gold may, by a certain force, be *drawn* through the hole in a wire plate; while the force, a million times multiplied, could by no means drive it through from the opposite side of the same wire-plate. Lest, however, I might by the above give a wrong impression of my views, it is needful that I should state, that a head, by long pressure of the pains, may sometimes be so moulded and reduced in diameter as to pass through a pelvis smaller than the head was at the commencement of the travail: whenever, therefore, the pains cease, or are insufficient to reduce it, the forceps, used as an extractor, may assist to that end by wire-drawing it; they should never squeeze it merely to compress and diminish its dimensions; they should always embrace it firmly enough to hold on and draw it down, so that the passages may mould it as it descends.

The celebrated Baudelocque, in order to learn, by inspection, the effects of direct pressure by the forceps, procured nine still-born children, and, by moulding their heads in the hand, restored them to the shape of the uncompressed head. He also procured three forceps of the very best quality, and as nearly alike as possible; he then applied the instruments over the parietal protuberances, and squeezed the heads until the handles were brought into contact, and tied firmly with a string, so that each head might be accurately measured while under the compression, and then compared with its dimensions before the instruments were applied. Such was the force employed in bringing the handles into contact, that the instruments, though very choice ones, were all spoiled by the experiment. The instrument was subsequently applied so as to embrace the forehead and occiput, and the results ascertained. These excellent experiments, for the particulars of which I must refer the Student to *L'Art des Accouchemens*, Part IV., chap. i., are commented on by Baudelocque as follows :—

"It may be concluded from these experiments: 1st, that the reduction in size of the fœtal head, included in the clamp of the forceps, differs according to the different degrees of firmness of the cranium at birth, and to the more or less complete closure of the sutures and fontanels. 2d, that this reduction cannot in any case be so considerable as has by accoucheurs been supposed, and that it can with difficulty, and very rarely, exceed four or five lines, with the instrument acting upon the sides of the head. 3d, that the degree of reduction should never be estimated from the distance remaining between the ends of the handles when they are pressed together in the act of delivering the head, nor from the amount of force employed to bring them towards each other. 4th, and lastly, that the diameters which cross the compressed one, far from increasing in proportion to the diminution of the compressed one, do not in general augment to the extent of a quarter of a line, and in fact are sometimes even lessened."

The above-mentioned results, procured by so distinguished a writer as Baudelocque, ought to suffice for removing any lingering disposition we might have to regard the forceps as a compressing instrument, and we should then be fully on our guard against the propensity to use it for such an object; but let it be considered that the head does not fill up the pelvis as a nail fills up the hole into which it is driven, but that it is always caught and arrested by two or perhaps four points on which it is impelled, and we shall see that if we do use it to squeeze and reduce the size of the head, we shall only reduce those diameters that are already small enough, and augment those that are already too large, for it cannot be adjusted on the points that are in such close contact as to constitute a real arrest. The most proper view to take of the instrument is, that it is a substitute for proper labor pain, supplying the want of expulsive force when wholly absent, or aiding it when its force is insufficient to effect the delivery of the woman. Impossibilities are not to be expected from it; yet in all those cases where it is inapplicable, we are compelled to resort to other measures of a far less pleasant character.

It is common to apply the forceps to the head only after it has got fairly into the excavation, and the nearer the head is to the external organs, the more easily may the instrument be adjusted upon it. Hence, whenever, in the management of a labor, we begin to perceive the signs that indicate the use of instruments, we often feel at liberty to wait until the presenting part can take an advantageous position, preferring to lose a little time, for the sake of acquiring greater facility and assurance of safety. Whenever the head has sunk so low as to get the vertex just under or behind the sub-pubal ligament, we experience little difficulty in placing the two branches, successively introduced, into their proper positions, because the rotation is completed, and the bi-parietal diameter does not occupy the entire transverse dimension of the pelvis; but when we have to apply it before rotation has taken place, there is frequently great difficulty in getting either the first or the second branch directly over the side of the head; but if we fail to adjust the branches accurately in opposition, we either cannot make them lock, or we lock them in such a way that the edge of the instrument contuses or even cuts the part of the scalp or cheek on which it rests, leaving a scar, or actually breaking the tender bones of the cranium, while the other edge cuts the womb or vagina by its free and projecting curve. In fact, the forceps is designed for the sides of the head; and if, under the stress of circumstances, we are compelled to fix them in any other position, we shall always feel reluctant to do so, and look forward with a painful anxiety to the birth, in order to learn whether we have done the mischief we feared, but which we could not avoid.

I ought also to mention, that cases occur in which the forceps seems to be clearly indicated, but in which, upon trial, we can by no means apply them; the size and position of the head are such that we cannot by force or dexterity get the blade of the instrument betwixt it and the bony passages; in such a case proper skill and judgment ought to be employed, and then, when we cannot succeed, we must be content to think that we cannot, and that no one else can ; and afterwards, we must resort to other means of relief. Further, we can sometimes adjust the forceps perfectly, but cannot effect the delivery, because the parts are too small. Here, also, we ought to suffer no feeling of mortification to vex us for want of success; we should feel assured that we have exerted a sufficient degree of strength and dexterity, a degree equal to what we ought to consider safe; and being then convinced or satisfied that our duty has been in so far done, we lay aside the forceps to resort to ulterior measures.

I have already said that the instrument is made for the head, to which alone it can be safely applied. It would crush or cut the breech, and the sides or the belly, if applied in breech presentations to those parts.

The forceps cannot be applied unless the parts are favorably disposed ; for instance, the os uteri must be dilated and gone up over the head. The vagina and perineum also must be in such a condition that we need have no fear of lacerating any of those parts ; else, the operation is contraindicated.

A man shall hardly be justified who inserts his forceps within the os uteri. He must wait until the circle has risen above the parietal protuberance, and can no more be felt.

The pains must have been proved insufficient for their office; or else the exigent demand for delivery, arising from hemorrhage, convulsion, or other states, must establish the indication. We should find ourselves inexcusable, if we should be led to use them where the pains are still of vast force, and where they fail of success on account of a preternatural resistance. If we judge that the power of the pains is already as great as the patient ought to bear, we ought not to apply the forceps, in order to add to the forces which are already perhaps of a dangerous degree of intensity.

The motive for the use of the operation should be clearly understood as referable both to the mother and child; to the mother alone; or to the child alone. The consent of responsible and interested persons should be obtained; the motives for the operation should, if possible, be clearly explained to the woman herself, and truthful, yet reasonable promises should be made to provide for her safety and comfort, both of them requiring the operation to be done. If time permits, some professional friend should be invited to witness and sanction the operation.

The position of the presentation should be well known; and, if needful, should be verified by the introduction of half the hand or the whole hand into the passage. The bladder and rectum should be evacuated, the latter by an enema, and the former by the catheter; the last precaution ought never to be neglected.

The bed should be prepared by bringing the end or side of it quite to the end or side of the bedstead, and then covering it with blankets and sheets of sufficient thickness to prevent the bed from being soiled. Part of a sheet should reach down to the floor, on which some cloths ought to be placed, to receive the fluids that commonly escape during the process of delivery.

The patient ought to be brought to the side or end of the bed, as the case may be, lying on her back, with the end of the sacrum projecting far enough over the bed to admit of the most unrestrained access to the parts by the hand and the forceps. While lying in this manner, the feet should rest on two chairs or on the laps of her assistants, sitting with their backs turned to the patient, and far enough from each other to allow the operator to stand or sit between them; the patient always being covered with a light sheet or blanket, according to the temperature of the apartment.

The instruments, at all seasons of the year, should be placed before using them in a bowl of tepid water; and, when ready, they should be anointed with sweet oil, which adheres to them better than lard.

Lastly, the parts should be freely anointed with lard.

The forceps are differently applied, according as the head is differently placed.

If the vertex present, and rotation have taken place so as to bring the point of the head just below or behind the sub-pubal ligament, the left-hand blade is to be taken in the left hand, and the fore and middle finger of the right hand should be passed upwards as far as conveniently can be done, betwixt the left ischium and the child's head, somewhat towards the posterior part of the pelvis, or towards the left sacro-iliac junction. The branch should be so held as to cross the right groin, in a direction from above, downwards and inwards, so as to let the point of the blade be near the vulva, in which it is next gently and slowly introduced, allowing the concavity of the old-curve to be in contact with the convexity of the head. In proportion as it advances, the point is directed upwards towards the plane of the superior strait, the handle coming downwards as the introduction proceeds, great care being taken to direct the point by the two fingers which guide it as far as they can reach. If any obstruction or difficulty is met with, let it be overcome by gentleness and dexterity, and not by force. For example, if the point comes in contact with the ear, that organ might very easily be lacerated by any rude force, and a great deal of caution ought to be observed in order to protect the child from such a maiming, and the medical attendant from such a disgrace. At length the blade is introduced sufficiently far to show that the point is nearly even with the chin, and the old-curve in proper contact with the side of the cranium and face, and that it covers the ear.

The end of the handle should now be depressed a little, so as to force the edge of the perineum backwards, and then given in charge to one of the assistants, while the right-hand branch is taken in the right hand, and the fore and middle fingers of the left hand are introduced into the vagina, on the other side, as in the case just described. The branch is laid across the left groin, looking from above downwards and inwards, and the point of the blade is passed into the vagina above the first branch. This one should also be at first directed towards the sacro-iliac junction of the right side, and elevated as it proceeds so as to be brought at last into exact opposition to the left-hand branch. If any difficulty occurs in bringing it forwards enough, the two left-hand fingers that are guiding it will serve to slide it edgewise into the proper position. The branches are now to be joined at the lock; and the union of the branches is very easily to be effected if the opposition of the two counterparts is accurate. If the opposition be inaccurate, the locking is impossible, and ought not to be attempted by violent force. When locked, let the handles be brought near enough together to make sure that the head is firmly grasped, and then the instrument is to be withdrawn a little, in order to effect its more complete adaptation to the convex surface of the cranium, which it grasps or contains within its jaws.

If the handles come not near enough into contact, that circumstance proves conclusively that the head is not properly seized; and nothing further should be done until the error be corrected. If they gape more than an inch and a half at the ends, they are not adjusted upon the parietal bones; but are obliquely fixed upon the frontal and occipital regions. They ought to be a little more than an inch apart at the ends of the handles.

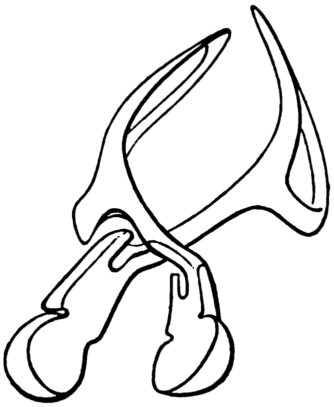
Whenever, during the process of introduction, a pain comes on, all action ought to be suspended until the pain has ceased. If this precaution be not observed, there is great danger of contusion, or laceration, by the blades of the instrument.

It very frequently happens that the first or left-hand blade passes readily up to its proper position, and takes its place on the side of the head and face, without communicating the least disagreeable sensation to the patient, or causing the smallest embarrassment to the accoucheur; but, when he attempts to put the other blade into position, he either fails to insert it as deep as the other, or, having done so, finds himself baffled in every effort to lock the joint.

The first blade has perhaps taken up so much space as to have thrust the head strongly over against the right side of the pelvis; leaving no passage betwixt it and the cranium along which to make the second blade glide.

Upon the failure, after discreet efforts, both of the counterparts should be gently withdrawn. Perhaps a new pain may now succeed in forcing the presenting part a little onwards; or, perhaps, after wholly withdrawing the right-hand branch, the surgeon may succeed in using the left blade as a vectis so successfully as to bring the head into a better attitude; so that, when the attempt to adjust the clamps is renewed, no difficulty is found to remain. He shall often succeed in adjusting the right-hand blade as a vectis, when he shall have withdrawn the left-hand blade.

Fig. 127.



When the two parts of the instrument are introduced far enough, they may have been so imperfectly adjusted that the concave edges of the new-curve may be almost in contact, while the convex edges divaricate very much, the ends of the handles having their flat surfaces obliquely placed, as in Figure 127. Let the Student carefully examine this figure, and learn from it how to comprehend the meaning of this *obliquity of the manubria* which is very difficult to understand without such explanation. It is not necessary for me here to make another figure, to show that, if the obliquity of the flat-faces of the manubria should be the reverse of what is here seen, it would be because the convex edges of the new-curves are too near, and the concave edges too far from each other. The instrument could not hold in such a state of it, but would slip off behind, or in front, and destroy the vagina. This could not happen except where the accoucheur has placed the instrument too near the coronal surface of the head, or too far from the bregmatic surface. An inexperienced person is very apt in this case to suppose the very reverse, or that he has placed the convex edge of the new-curve too far from the pubis and too near the sacrum; whereas, it is really too near the pubal and too far from the sacral region of the excavation.

If he makes this mistake, which, I repeat it, he will be apt to make, he would do well to remove the blade entirely, and give himself time to reflect anew upon the position of the child's head, and the relation of its right and left ears to the pelvic walls. In this way, having mastered the topography of the case, he will be likely to succeed upon renewing his attempt. It would be far wiser and far more charitable to do so than to make a barbarous and most unjustifiable endeavor to extract with forceps oblique and not in apposition, which they never can be when not in opposition.

Should he now succeed in making the adjustment, the handles will point parallel to the left abducted thigh in vertex labor in the first position, the head incompletely rotated; or, *vice versâ*, to the right thigh; or, when rotation is complete and extension begun, they will coincide with the mesial line of the trunk. In proportion as the extension of the head makes greater progress, the handles rise upwards towards the woman's belly, for the head, bringing the forceps along with it in its descent, must pass out in coincidence with Carus's curve. The end of the handles in rising describes that same curve with a greater radius.

The instrument being now adjusted over the sides of the child's head, as in Fig. 126, let care be taken, before proceeding, that no external part be caught or pinched by the lock or joint. This is ascertained by passing the fingers round and within the orifice of the vulva. In general, no attempt to extract should be made until pain or tenesmus comes on. When the woman is ready, let the handles be held in the left hand, the middle finger of the right hand being placed in front of the joint or crossings, to assist in the extraction, while the index finger is to be pressed against the child's head, and *always* retained in contact therewith, during the extractive effort. The finger ought *always*, in this state, to touch the head; but if it leaves it, it is only because the blades are slipping off, in which case traction should cease until they are adjusted again. While the finger remains in contact with the head, there is no slipping of the instrument. It is shameful to let the forceps slip off the head and fly from the vulva with a suddenness sufficient to lacerate the parts in the most frightful manner. An operator ought to be turned out of doors, as soon as he allows so scandalous a misdemeanor to occur from his carelessness or ignorance.

The most successful mode of using the instrument at first is, to employ it as a lever, by moving it from handle to handle, exerting at the same time enough extractive force to prevent the opposite blade from plunging deeper into the parts, while we move the handles to the right, or the left.

Let me here repeat that, in exhibiting to my Class a demonstration of the lever-like action of the forceps, after having adjusted the instruments on the head, in the phantome, I take hold of the blunt-hook of the left-hand branch, and, leaving the other untouched, carry it (the left-hand branch) over towards the left thigh; in this action, the blade of the right-hand branch is found to be withdrawn considerably, bringing the head along with it, but the blade of the left-hand branch does not emerge at all. I next take hold of the blunt-hook of the right branch, and, drawing a little downwards, I carry it over towards the right thigh of the phantome, by which the blade of the left branch is withdrawn in like degree, bringing the head, which it grasps, along with it; so that, by several successive movements of the sort, the head is soon found to emerge completely from the vagina. It should be observed that, while I carry the left-hand branch to the left side, I do not allow the right-hand cochlea to sink deeper into the vagina, but keep what I have got with it, and then draw out an eighth or a fourth of an inch of its fellow, and *vice versâ*. It is clear that if I successively get out an eighth of an inch of the right-hand, and then an eighth of an inch of the left-hand branch, keeping all I can gain, I must in the end have drawn out the whole of the clamps, in which will be found the head. The problem is to adjust the forceps on the child's head, and then extract the forceps containing that head. Hence, get out one-eighth of an inch of each blade in succession by using its fellow as a lever and tractor. One trial of this method on the phantome will show the Student how powerful is the action of the forceps used in this way. In this way, as one blade emerges, the other does not re-enter the passage.

In practice, all attempts at extraction ought to be made in conformity with the natural processes and dispositions or tendencies of the healthiest labor: there ought to be no hurry, no impatience, no temper exhibited by the operator.

In natural labor, there are intervals of rest; in artificial labor, there ought also to be good intervals of rest; which are required both for the physical relief and the moral relief of the patient. Her mind is strained to the highest tension, by the mere thought that she is under the operation, and the tissues against which we are dragging the child yield better, for a minute or two of rest, repeated from time to time, as the case admits or demands: nature gives pauses, so should the surgeon.

It should not be forgotten that the forceps embraces the head in a direction from the vertex to the chin; nor that, when the head is evolved under the stress of the instrument, it ought to undergo the same mutations as it would if expelled by the natural pains. Hence, as the vertex emerges, and rises towards the front of the pubis, the ends of the handles must be permitted to rise along with it. They must never be prevented from taking the direction which the emergence of the head, directed by the resisting perineum, naturally tends to give to them. In the last moments of the delivery of the head, during its *extension*, the inferior part of the occipital bone rests in contact with the mons veneris. If the forceps is still upon the head, in this situation, its handles will almost touch the abdomen of the mother.

A goodly proportion of the examples of forceps operations met with here, are, as I think, rendered necessary by rigidity of the soft parts, to overcome which, the expulsive faculties have been exhausted by vain efforts. Let it be well borne in mind that, though the expulsive powers of the womb are enormously great, they sometimes fail of success because the vagina is not dilatable, or the perineum will not yield, or the labia will not suffer elongation; or all these obstacles may be in combined opposition to the delivery: remembering these things, we should not impatiently urge nature beyond her powers, lest we do injury where we are most solicitously endeavoring to do good. By rude and untemporizing exercise of strength, we incur very great hazard of rupturing these organs, and of bringing ourselves into some discredit, and of maiming the patient most injuriously. It is very true that the forceps acts as a dilator by separating the sides of the vagina and of the vulva before the advancing head; but, on this very account, and because it is so powerful a dilator, we are bound to exercise the greatest prudence in the use of it. I have, in many instances, refrained from the use of the forceps, in cases where they were, on other grounds, strongly indicated, because I could appreciate the unreasonableness of any attempt suddenly to dilate the external organs, which I perceived to be far more frangible than dilatable.

It not unfrequently happens, that, in cases where the head has suffered a long arrest, and the natural powers have proved incompetent to its effectual advancement, the application of the forceps, and very moderate tractions with the instrument, will put it in rapid motion, so as to leave no doubt of its speedy expulsion under the natural powers. In such cases I have been accustomed to remove the forceps, and allow the child to be born by the spontaneous exertions of the womb. I do this with the view of sparing pain to the mother, and under the conviction that the organs are less likely to suffer contusion or laceration without, than with, the instrument. But it ought not to be done except under full conviction that the expulsive powers, thus set in renewed activity, will be successful, since it is very mortifying to withdraw them prematurely, and be obliged to reapply them.

Inasmuch as we cannot exert any very considerable tractile force, without compressing the head with a severity proportioned to it, we should occasionally relax our hold on the handles, in order to let the blades cease from pressing the cranium. The effects of the pressure are rendered less dangerous for the child, by being occasionally intermitted. The same reasons are conclusive against the practice used by some persons, of tying the handles with a fillet, which makes it impossible to relax the grasp of the clamps, without the trouble of untying the fillet every time such relaxation happens to be thought of.

Extreme caution is required for conducting the last stages of the operation with safety. The perineum should be well supported with a napkin held by the operator, or an assistant; and the delivery of the head should be deliberate and slow, and the patient exhorted to lie as still as possible. In delivering a lady rather advanced in life of her first child, I was using a moderately strong traction while the head was passing out. On a sudden she threw up the pelvis, which changed the line of movement of the head. It was moving along Carus's curve; as I had the handles of the forceps pretty firmly grasped during the muscular efforts I was making, I could not let go soon enough to prevent the head from lacerating the perineum very severely, by departing and moving along a tangent of that curve. I felt then, and still do feel confident, that the perineum would not have been torn but for the very unexpected and violent movement of her pelvis. She recovered from the effects of the laceration in about three weeks.

As soon as the head is delivered, the forceps should be removed and handed to an assistant, while we take care to attend to the delivery of the shoulders, and finally receive the child, which is to be done as in the most natural labor.

To apply the Forceps before the Rotation is completed.—A more difficult operation than that just described is the application of the forceps where rotation of the head has not taken place.

The first, and one of the most important steps here, is to ascertain accurately—I say with absolute accuracy—the situation of the fœtal head. If the finger can reach the posterior fontanel, we ought to be able to appreciate, from that point, the relative situation of all the other parts of the cranium. If any doubt, however, remains upon the mind, after an attempt to discover the truth by the employment of the finger alone, the whole or one-half of the hand should be introduced into the vagina, so that, by grasping the cranium with several fingers, we may become positively sure that our diagnosis of the position is correct. We will suppose the examination to have resulted in ascertaining that the vertex is in the first position, *i. e.* directed to the left and front side of the pelvis.

The patient is to be placed upon the back, as in the other case; and the point of the left-hand branch of the forceps, guided by two fingers of the right hand placed in the left posterior part of the vagina, is to be passed upwards in front of the left sacro-iliac symphysis. The end of the blade being conducted up to the child's chin, it will be found that the pivot of the blade will look upwards and to the left, and the handle will be inclined towards the left thigh of the patient. The blade being properly adjusted, an assistant should be put in charge of the instrument, while the right-hand branch, guided by two fingers of the left hand, is next to be introduced into the right and lower part of the vagina, and gradually conducted forwards along the side of the head to the right side of the chin, so as to cover the ear; the notch being just opposite to the pivot. If the blades should not be found opposite to each other, they will not lock; they must be placed in opposition by bringing one of them more to the front of the pelvis, or pushing the other more towards a lower part of the sacrum;

and, when they press upon the opposite sides of the head, there is no difficulty in uniting them. When the branches are locked, they are inclined towards the left thigh of the mother, the pivot still looking upwards and to the left, and the handles having an appearance of awkwardness in this situation, which, to a tyro, communicates a feeling of doubt as to their being well placed. They look as if they were crooked, but this very awkwardness is the best evidence of their being situated right.

When ready to proceed with the extraction, advantage should be taken of the first pain, not to rotate the head by twisting the vertex to the right, but by moving the instrument from handle to handle, using at the same time a proper degree of traction. The rotation takes place as the head advances, and the vertex very soon comes under the pubic arch, without any particular effort being made to rotate it. As soon as the vertex reaches the pubis, the peculiarities of this application of the forceps cease, and the remaining steps of the operation proceed as in the first-described case.

The vertex may present in the second position, in which case the posterior fontanel is towards the right and front of the pelvis. Let the woman be placed as before: after introducing two fingers of the right hand into the left side of the vagina, the left-hand branch of the forceps is to be conducted into it towards the fourchette, the point of the blade sweeping upwards towards the child's chin, covering part of the ear, and coming off at the vertex. The handle will look towards the right thigh, and the pivot will point upwards, and towards the right. The handle of the forceps should be very much depressed in this case, because, as the lock portion of the branch is inclined towards the right, it leaves scarcely space for the introduction of the female counterpart, which is to be introduced on that side; but a considerable depression of the handle affords a more abundant space for that purpose. The branch, being correctly placed, is put in charge of an assistant, while the right-hand blade, being guarded by the introduction of two fingers, is passed into the vulva at its lower or back part, and its point turned upwards and towards the left, as the handle sweeps downwards and towards the right. The joint is brought into apposition and locked.

As soon as a pain comes on, traction, combined with the lever-like action, must be instituted, and as the head descends, the mechanism of the pelvis compels the vertex to rotate towards the pubis, under the arch of which it soon begins to jut. This being effected, the peculiarities of the operation are removed, and its remaining conduct is to be fulfilled as before.

Forceps in Occipito-Posterior Positions.—In those cases in which the vertex, instead of coming to the arch, rotates backwards and falls into the hollow of the sacrum, the forceps will be more likely to be required, because the difficulties of expulsion are greatly enhanced by the position. In this, as in all the occipito-anterior positions, the vertex must escape first, notwithstanding it be directed backwards towards the sacrum; but, in order to do so, it must glide down the sacrum and coccyx, and along the perineum, after having distended it enormously, until the fourchette slides backwards and upwards behind the occipital bone of the infant. In order to effect this, the occipito-mental diameter of the fœtus must become parallel with the axis of the inferior strait, or at least it must become nearly so. Such, however, is the violence of the flexion required for that purpose, that much time is lost before it can be effected; and the woman is, in many of the instances, exhausted, and the pains gone, before it can be completed.

The position is ascertained by feeling the large fontanel behind the pubis, or just within the arch, while the sagittal suture runs backward towards the sacrum.

When it is found that the forceps will be required to extract the head, let the male branch, held in the left hand, be introduced into the back and lateral part of the vagina, and conducted towards the chin as far as possible, carrying the instrument up near the left sacro-iliac junction at first, and gradually bringing it forwards so as to apply it accurately to the side of the head. The oblique diameter of the head dips so much towards the sacrum, that it is impossible to embrace the head properly without depressing the handle very much, and thrusting the edge of the perineum very far back, which, though not a little painful, cannot be avoided; otherwise, the head will be grasped coincidently with its perpendicular and not its oblique diameter. The instrument being held in this way by an assistant, leaves a sufficient space on the right side of the vagina for the introduction of the female branch, which, being adjusted and locked with the male branch, leaves the handles very much depressed.

Having been well satisfied that none of the external parts are pinched at the lock, and that the head is firmly grasped, the first movement in extraction should be to raise the handles up a little, with a view to compel the chin to approach still nearer the breast, and in that way permit the vertex to glide down the sacrum and coccyx, assisting its descent by means of the lateral or lever action of the forceps; the intention of the operator should be to draw the vertex off the sacrum, off the perineum, and fourchette, and then let the head extend backwards on the outside of the pelvis.

As the perineum must, in this labor, be enormously distended, it behoves that great care and patience should be exercised, lest it might give way. It should be well supported, and, as soon as the vertex clears the edge of the perineum, the handles ought no more to be raised, but on the contrary depressed, in order to let the head extend backwards—a movement exactly the reverse of what takes place in the occipito-anterior position. The head being delivered, the shoulders rotate in the excavation, and the right or the left one comes to the pubic arch, so that the rest of the process is concluded as in a first or second position, except that the front parts of the child, instead of the back parts of it, come out towards the front of the pelvis, which makes no difference of any import.

The application of the forceps for the occipito-posterior position, say the fourth or fifth, where rotation has not taken place, is more difficult than the one just above treated of. The blades are with much less facility applied, and indeed cannot take hold along the oblique diameter so completely as is to be desired; they rather seize the head along its vertical diameter at first, and are gradually brought into parallelism with the oblique one, as extraction proceeds. Reflection upon this circumstance is very needful, at the time of the operation, lest the infant's head be, by want thereof, contused and ground, and even cut by the blades.

The introduction takes place as in a first or second position, the fourth corresponding to the first, and the fifth to the second. The handles must be well depressed in this case, and it will be allowable to make prudent efforts to rotate the vertex into the hollow of the sacrum —it being always understood that, in such labors, all hope of bringing it to the pubis has, after experiment, failed.

Forceps in Transverse Position.—The head is sometimes situated transversely, the vertex resting against one, and the forehead against the other, ischium. Let us suppose the vertex at the right ischium. It is intended to apply the male blade to the left side of the head, with a concave edge of the new-curve looking towards the occiput.

Let the left-hand branch be therefore introduced into the left and posterior part of the vagina, and as the point enters more and more, the handle should be depressed, until the curve applies itself on the left side of the head in a direction from the vertex to the chin, or as nearly so as may be practicable. It should be understood, however, that the blade will scarcely apply itself in that direction, because the chin is not so near to the breast as it ought to be. When the blade is adjusted, its pivot looks to the right, and lies in a horizontal position, while the handle juts out very obliquely towards the right thigh, which is much abducted.

As the left-hand branch projects towards the right, there will be some difficulty in finding room for the introduction of the right-hand branch; yet the other can be temporarily pushed out of the way, so as to let the point enter at the inferior and right side of the orifice of the vagina. When the curve is applied to the convexity of the cranium, it must be pushed upwards, backwards, and towards the left, so that its point may approach the chin, and the notch be brought in apposition with the pivot, and so locked. The head, being firmly held, may be moved in the direction from handle to handle, and moderately rotated, so as to dislodge it; and the tractions being soon commenced, it is found to descend, the forceps rotating along with it, until the pivot turning to the left becomes vertical, and the fontanel appears at the arch.

Now it appears that in all the operations I have described, the male or inferior blade is to be first introduced, without doing which the female or upper blade cannot be introduced without getting it below the inferior blade. There is one position of the head, however, in which it is proper to introduce the female blade first—and there is but one—which I shall proceed to treat of. The position to which I allude is that in which the vertex touches the left ischium, and the forehead the right ischium.

It is clear that, when the instrument has grasped the head in this position, the handles will project very much towards the left thigh, in strong abduction; but if we introduce the male blade first, inasmuch as its handle will project towards the left thigh, it will occupy all the space on that side, and hinder or prevent the insertion of the second branch, for there will be left no place for the handle to be depressed in. To avoid this difficulty, therefore, take the female or upper blade in the right hand, and introduce it into the posterior and right side of the vagina, conducting its point as near as may be to the chin, and over the face to the right side of the head behind the pubis, leaving the handle to project towards the left thigh. Next, take the male blade into the right hand, and, turning the concave edge of the new-curve downwards, insert the point into the right side of the vagina, below the female branch. Let the fœtal face of the clam apply itself to the convexity of the head, and slide it onwards, and, in proportion as it enters, make it sweep round the crown of the head towards the back of the pelvis. In effecting this, the handle comes gradually down as the clamp gets on the left side of the cranium, and at last the lock is found to be where it ought to be, namely, under the upper or female blade, with which it is then locked.

When we have ascertained that the head is properly held, or grasped, we may proceed, as before, to move and to attempt to rotate it, and then deliver as soon as the vertex emerges from beneath the symphysis pubis.

The Forceps in Face Presentations.—Among the sixteen thousand four hundred and fourteen women delivered at the Dublin Hospital, under charge of Dr. Collins, thirty-three had face presentations, and four of these had still-born children, which is a little less than twelve per cent. of mortality in this labor. I have said enough in my observations on Face Presentations, at page 377, *et seq.*, to make it unnecessary for me to repeat anything here in relation to the difficulties of that sort of birth. It is merely proper for me to remark that the forceps, when their use is indicated in this labor, must be applied to the sides of the head by carrying the points of the blades nearly up to the vertex. In those examples in which the chin comes to the pubis, the handles need not be very much depressed; but in those in which the forehead is at the pubis, the handles must be at first very strongly depressed, and, as the case proceeds, they must be strongly elevated, so as to get the chin down to the fourchette, over which it must slip, and then begin at once to approach the breast again, in the act of flexion. As soon as the chin is free, we allow the handles to descend again, while we continue the traction until the head is completely emerged. I shall take this opportunity for stating, that I conceive it to be impossible to have a better instrument for this particular labor than Davis's forceps, as made by Botschan, 35 Worship Street, London. This instrument holds the head as in a basket, and is far less likely than any other with which I am acquainted, to bruise or in any way injure the child. Figures 84 and 87 show very clearly the difference between a face case, in which the chin comes to the pubis, and one in which the forehead is there, and may well show the manner in which the head is to be taken hold of by the forceps.

The Forceps in Locked Head.—The head is said to be *locked*, whenever two opposite sides of it are caught by two opposite sides of the pelvis, and held so firmly there, that it can descend no lower, and either cannot, or cannot without great difficulty, be pushed upwards again into a freer or larger space. In general, when the head is thus locked, it is in its transverse or bi-parietal diameter, one parietal protuberance being held at the pubis, and the other at the projection of the sacrum. Supposing the pelvis to be only three and a half inches in its antero-posterior diameter, and the head to be three and three quarters in its smallest diameter, then it might happen, as it does in fact happen, that the cone of the head should be driven, by the force of the pains, long continued, into the narrow pass, the delicate bones of the head giving way, and becoming indented under the pressure of the promontory of the sacrum, and moving downwards until it becomes immovably fixed and held fast by the opposing points of the pubis and sacrum. This state would constitute what is called a locked head. Many evils result from this locking of the head. For example, the woman, after vain efforts and very great sufferings, becomes feverish, and at length loses her pains altogether; or a state of constitutional irritation comes on, marked by a frequent, small pulse, coolness of the extremities, sunken or cadaverous appearance of the face, delirium, jactitation, and vomiting, which, if not soon relieved, is followed by death, which hastens with rapid strides to end the strife. The pressure destroys the child; it also produces the death of the parts of the mother that are compressed betwixt the pubal or sacral bones and the child's cranium; or it causes inflammation to take place, to be succeeded by sloughing and its consequences. Or, the urethra being effectually compressed betwixt the cranium of the fœtus and the symphysis pubis, a total suppression of urine takes place, followed by its very serious consequences; or, lastly, the soft parts, perhaps the vagina, or possibly the womb, being pinched as above stated, may give way during a pain, and the laceration, once begun, may extend so far as to allow the child to escape into the peritoneal sac.

Whenever, then, the head is found to be so situated that it will neither advance nor retreat, it may be said to be locked, and the case ought to command the greatest care from the medical attendant.

It is manifest that, if the arresting points of the pelvis touch the head at its parietal protuberances, no possibility exists of applying the forceps in that direction; there is not space enough to admit of the blades, and if they are to be applied to the head, it can only be on those parts that are free from great pressure, as the forehead upon one side, and the occiput on the other; and this must be done notwithstanding any fear we entertain of contusions upon the face, of which there is some risk, but which very risk becomes less as it is the more constantly borne in mind.

When the attempt to deliver in this case is about to be begun, the forceps should be well pressed together, so that, when the lever-like movement takes place, their blades may not be allowed to slip or slide upon the forehead, which would thereby be very liable to excoriation, or even to be cut by their edges, formed, as is well known, for application to a convexity different from that of the face. The motion from handle to handle, assisted by a sufficiently powerful traction, will, ordinarily, succeed in disengaging the head, and getting it down into the excavation; upon which the blades ought to be removed, and, if the pains are revived and prove strong enough, they need not to be reapplied; but, in the lack of a proper force, they should be adjusted anew, and on the sides of the head, which is the part for which their curves were fashioned, and to which only they are really adapted.

In making compression, let it be carefully remembered that that compression is not designed for the purpose of diminishing the diameters, but only to hold the object more securely or steadily; any amount of compressive action beyond this indispensable one is mischievous, as tending to augment the difficulty, by forcing the parietal protuberances more decidedly against the arresting points. I succeeded by this means in drawing a head through a pelvis so faulty in its antero-posterior diameter, that I could readily touch the sacrum, by introducing only the forefinger into the vagina. The patient was a very small woman of color, to whom I was called in consultation by a young medical friend; the child was dead, but not injured by the instrument. So great was the difficulty, that I at one period entertained very seriously the idea of performing the embryulcia. If I had known the child to be dead, I should have greatly preferred to do so.

In these cases, the operator, who alone can estimate the degree of force he employs, is the sole judge as to whether that force is too great to be compatible with the safety of the woman: should he, upon a due consideration of it, deem it wholly unsafe to proceed, or impracticable to succeed by any legitimate exertion of his strength, there remains the resource, sad as it is, of the perforator. Now that we have the advantage of the stethoscope, we can, with great certainty, determine the question of the life or death of the fœtus in utero; and where we find, upon auscultation, that its life is extinct, we need have but little hesitation in applying the perforator, in order to reduce the size of the skull by extracting its contents. In doing this, however unpleasant the operation, we remove much of the danger arising from a further continuance of the pressure on the soft parts of the mother. In case the stethoscope reveals the fact that the fœtus is still living, we should feel constrained to wait so long as to overstep, perhaps, the boundaries of prudence.

But it does not always happen that the head is locked in the direction and situation above pointed out. The vertex may be jammed down behind the pubis, and the forehead in front of the promontory. Here the forceps can be legitimately adjusted; and they admit of the application of a greater force, and it will be probably found less difficult to unlock and rotate the head, in consequence of the greater convexity of the points of arrest. Some degree of rotation ought to be given to the head by means of the forceps until they succeed in getting it down into the excavation, whereupon the vertex may be rotated back again to the arch of the pubis, and so withdrawn.

Impaction of the head cannot take place at the superior strait; the shape of that opening is such that its whole circumference cannot be filled by the head of a child; there would always be found a part of it in which not only the blade of a forceps, but a couple of fingers, would find passage; but after the head has sunk below the strait, the conical figure of the excavation perhaps admits of its whole circumference being occupied by the head, which fills it up completely, and so completely that the forceps can find no space in which to pass. Let the attempt, however, be made, and in every unavoidable case, where it fails of success, the head can be opened, and the skull made to collapse.

The Forceps in Pelvic Presentations.—It only remains for me to relate the manner of applying the forceps in breech or footling cases, wherein the head refuses to come away after the shoulders are delivered. I have already said, that it is my invariable rule to have the forceps in readiness, in every instance in which I discover that the head is to be the part last born.

When the instrument is wanted for such a use, it is wanted suddenly—immediately; and the medical attendant fails in his duty, who finds himself in want of forceps for this purpose, and is obliged to send for them; for a child perishes while a messenger is going a hundred yards, or putting on his boots.

There is no need of my going again at length over the causes that render the forceps necessary on these occasions. It is enough, that the expulsive powers are wanting, either from disproportion, from cessation of efforts both voluntary and involuntary, or from mal-position. If the head continues undelivered but a few minutes, the child is lost.

Supposing that the shoulders are delivered, and the face in the hollow of the sacrum; let a napkin be wrapped round the body of the child, including the arms, which should be placed against its sides, so as to keep them out of the way. Then, giving the body to an assistant, let it be held in a position nearly perpendicular, by the thighs or hips, so as to press the nucha against the arch of the pubis; or its back may be carried over nearly in contact with the mother's abdomen, to get it out of the way. The left-hand blade, guided by two fingers of the right hand, is then to be passed in at the left side of the vagina, and applied to the head, covering it in the direction from chin to vertex. The right-hand branch is next introduced, with similar precaution, into the inferior and right side of the vagina, and so conducted on to the head as to embrace it from chin to vertex. As soon as the instrument locks, the tractions are to be commenced, and there will be, in general, little delay in the extraction, if the handles be raised as the head emerges; they requiring to be elevated, just as is needful in the delivery of occipito-anterior positions. If an accoucheur should attempt to perform this operation for a patient in any other than the dorsal decubitus, he would find himself greatly embarrassed.

But—if the child be unfortunately born with the toes towards the pubis, and rotation in the subsequent stages cannot be effected, so that the face is uppermost: if, in this case, vain attempts to deliver by the hand have been tried; then, let the woman lie on her left side, with the thighs strongly flexed; let the child be turned back as far as it can be done with safety to its neck, so as to bend the neck very much backwards. By giving to it this position, the forceps can be introduced in front of the child, the left-hand branch being first passed up on the left side of the chin and carried as far as the vertex; while the female branch is introduced upon the opposite side so far as to allow of its being locked with the pivot. As soon as the head is properly seized, let it be drawn downwards in such a direction as to cause the chin to emerge under the arch; to which end, let the handles be at first somewhat lowered.

Where, however, it can be effected with proper celerity, it is better, for this application of the forceps, to bring the woman to the edge of the bed, and, allowing the perineum to project beyond it, cause her feet to be supported in the usual manner. The child, wrapped in a napkin, can be well intrusted to a kneeling assistant, as it is held nearly in a vertical or standing position. The branches of the instrument have, by this means, free access to the left and right sides of the vagina, and they lock with the greatest ease in front of the throat. Except in such a position of the woman, I cannot conceive how it would be practicable to use the long forceps; but Haighton's or Davis's forceps could be applied while on the side very easily.

Section of Pubis.—I have little to say here in regard to the operation of Symphyseotomy, commonly called the Sigaultian section—an operation which was proposed and performed by M. Sigault, in the year 1777.

The proposition to increase the dimensions of the planes of the pelvis, by cutting asunder the symphysis pubis, excited, soon after the promulgation of it, a great sensation throughout Europe, and many operations have been performed with various success. It is probable, however, that the increase of amplitude of the planes of the pelvis is not so considerable as the friends of the section at first hoped for, and the dangerous traction of the tissues behind the separated pubes, and the gaping of the sacro-iliac junctions, one or both, were causes of ill success that have allowed it at last to fall into complete desuetude. So far as I know, the operation has never been done in this country. I feel not the least inclination to recommend the performance of it, and I refer the reader, who may feel interested in inquiring into this method, to M. Baudelocque's work on midwifery, and to the curious work—*Essais Historiques Littéraires et Critiques sur l'Art des Accouchemens*, par M. Sue, le jeune, Paris, 1779, 2 vols. 8vo. Dr. Churchill, in his *System of Midwifery*, p. 376, gives the statistics of the operation, as it has hitherto been done, and, in the most emphatic manner, discourages and condemns it.

Before I close this chapter, I beg leave to reiterate the expression of an opinion which I have already uttered at page 539—it is, that the obstetric forceps is the child's instrument; that the perforator, the crotchet, and the embryotomy forceps are the instruments for the mother; and that the Cæsarian operation, in its spirit and intention, should be devoted absolutely to the conservation of the mother alone. In saying so, I am not insensible of the great satisfaction to be enjoyed by that surgeon who, under the distressing duress which should alone compel him to subject a living woman to the Cæsarian section, is rewarded with the happiness of rescuing both the child and its parent from the jaws of an otherwise inevitable grave. I hold that no man has a right to subject a living, breathing, human creature to so great a hazard as that attending the Cæsarian section, from views relating to any other interests than those of his patient.

I believe that the Cæsarian operation ought not to be performed in any case, whether the child be living or dead, in which, under the dictates of a ripe and sound judgment and perfect knowledge of the principles of Midwifery, a decision may be obtained, that a delivery *per vias naturales* is less dangerous to the mother than that by vivisection.

Now, as to the question concerning the pelvis through which it is possible to deliver, I think it impossible to fix, as some writers think it desirable to do, a minimum aperture through which a woman may be safely delivered. Elizabeth Sherwood was delivered in a pelvis of one inch and three-quarters, and I twice delivered Mrs. R. with a pelvis of two inches; but to say that a pelvis one inch and three-quarters is the lowest through which a woman can expel a child, is to speak contrary to the record. Indeed, the dimensions of a pelvis, which by their reduction render a Cæsarian section indispensable, are variable dimensions; these dimensions never can be fixed and prescribed by precept or law, for one woman may have strength and courage and endurance to enable her to bear a delivery in a pelvis of one inch and three-quarters, as in Elizabeth Sherwood's case, whereas, in another woman the lapses of her strength may be so rapid, and the exigencies of her condition so urgent, that, if she be not promptly relieved, she will inevitably be lost. Hence, it appears that my assertion is a correct one, that the dimensions demanding the Cæsarian operation are variable dimensions. If we go down to diameters of one inch and a half, or to diameters of one inch, then the question of delivery *per vias naturales* is set aside. But we may find a case in which a woman, having a pelvis of two inches and a half, ought to be delivered by the section, because, in our judgment, we conclude that she cannot live long enough to escape by the slow process of a crotchet operation. I should not hesitate, therefore, to recommend the Cæsarian operation in a pelvis between two and two and a half inches in one case, nor would I hesitate in another case to recommend an embryotomy operation in a pelvis somewhat below two inches in its diameter.

I have been present in a consultation in which urgent demands and pressing arguments were in vain proffered to induce me to consent to a Cæsarian operation; these arguments were based chiefly upon the claims, to superior rights, of the child. In that case, as in all others, I was actuated in my opposition to the operation by the firm opinion that the child has no fixed claims whatever, if they come to conflict with the rights of its more important parent; and I regard myself as not guilty of inhumanity in indulging or in expressing this sentiment—and I repeat a sentiment expressed upon page 524, in the quotation from Tertullian: "*Atquin et in ipso adhuc utero, infans trucidatur necessariâ crudelitate, quum in exitu obliquatus denegat partum matricidus qui moriturus.*"

It appears to me to be a very important matter that the medical profession should have just views as to the indications of these grave and direful operations. As I have great reason to think that many gentlemen, my brethren, have not given themselves time to reflect upon all the points of the indications, I am the more desirous to have an opportunity to state my own convictions in the matter, and I should be glad in the most emphatic manner to enter my protest upon the records of Obstetrics, against the Cæsarian operation being performed with any other views than those relative to the conservation of the mother, with the salvo always, that to save the child is a great additional good fortune. I believe that he who performs the Cæsarian section upon views relative chiefly to the conservation of the fœtus flies in the face of the soundest doctrine; and I cannot understand how the conscience of such an operator should ever be appeased under the pungent reflections that must follow a death not rendered inevitable by the exigencies of his patient.

The number of cases of deformed pelvis met with in the United States, appears to be far less considerable than those met with in England or in the Continent of Europe.

CHAPTER XVI.

EMBRYOTOMY.

THE implements employed in Embryotomy, or those operations in which the body of the fœtus is cut by the surgeon, are various. They may, however, be all comprised under the denominations of: 1st, the perforator; 2d, the crotchet; and 3d, the embryotomy forceps. In cases, very rare ones, in which the decapitation of the child is required, a knife of a peculiar form is to be had. I witnessed the decapitation of a fœtus thirty-five years ago, in 1813, and fortunately have seen no such operation since that one.

Perhaps there is nothing to be met with, in the very troublesome and anxious profession of an obstetrician, that is more painful to his feelings than the management of a case of labor in which it is required to mutilate the child, in order to extract it from the maternal organs. It is fortunate that this odious duty does not occur very frequently; and we are indebted to the inventor of the forceps, Chamberlen, for an exemption from it in the present age in numerous instances, in which, without the important uses of that instrument, we should be compelled to resort to the perforator and the hook, which comprised nearly the sum of the instrumental resources of the ancients. We are also in modern times highly favored by the application of the stethoscope or direct auscultation, in acquiring greater certainty relative to the life of the fœtus, whose state of life or death can now be very accurately determined by that means; thus relieving the mind of a most painful solicitude by the certainty of its death, if that event should have happened, in cases in which we are compelled to apply destructive instruments for its delivery.

When the fœtal head is driven into the pelvis, and arrested there in consequence of disproportion of its diameters to those of the bony canal through which it is to be transmitted, if the arrest cannot be obviated by the hand, the lever, or the forceps, there is danger that the mother may suffer so much constitutional irritation from the fruitless efforts she makes, and the agonizing pain she endures, as to sink into exhaustion, and perish with the child still undelivered; and this, not only in the case of a cephalic presentation, but also in that of the feet, or that of the breech—in short, in all situations where the head cannot be got away through the pelvis except after it shall have been reduced in its magnitude. But even in those instances in which the woman is not threatened with exhaustion, she is liable, from the pressure of the head, to suffer inflammation or gangrene of the soft parts, which are contused by it, or she is exposed to the danger of lacerations of the womb itself, or of the vagina, whose consequences are greatly to be feared and deprecated.

Exhaustion, manifested by cessation of the pains, smallness and great frequency of the pulse, a haggard and sunken countenance, anxiety, jactitation, coldness of the extremities, profuse viscous sweats, and delirium, may come on, in labors that are drawn out too long from smallness of the pelvis, or from rigidity of the soft parts; cases in which we may discern, very clearly, the necessity of immediate delivery, to rescue the woman from impending death. When such signs are present, and the child is known to be dead, if the ergot and the forceps are found, upon trial, to be unavailing, recourse must be had to the most speedy means of relief, to wit, the opening of the head and discharge of its contents, with a view to the collapse of the cranium. We have less of the feeling of abhorrence above mentioned, when obliged to do this operation on the dead child; but, even in that case, we feel that our acts, as physicians, may be misconstrued by ignorant bystanders; so that, even here, embryulcia is a most unpleasant, event in practice. It ought always to be esteemed a point of duty to state clearly the condition of the child, and the urgent motives for lessening the size of the head in order that it may pass—or pass with safety to the mother.

The object of lessening the volume of the head is effected by the introduction into one of the fontanels or sutures, of the perforator, commonly called Holmes's perforator, the blades of which being afterwards opened, make a free incision, through which, if enlarged by a crucial cut, the cerebral contents are either extracted at once, or allowed to escape slowly under the pressure of the pains. As soon as the opening is made, it is common to push the perforator deep into the cavity of the cranium, or to introduce a crotchet so as to break up the textures within, and then, seizing the head by means of the sharp hook, which is applied to any convenient situation on the outside or in the inside of the skull, to draw it through the vulva, and deliver it; after which, if the woman has not suffered too severely, she soon recovers of the effects of her preceding fatigue and distressing pains.

This is the simplest and easiest case of embryulcia, and is one that any humane practitioner would or might perform without hesitation, upon the proper grounds for the proceeding being fully set forth before him.

Yet, notwithstanding the facility with which the operation of embryulcia may be performed, it is one so unnatural, and so shocking to the feelings of all concerned, that it ought not to be done without very satisfactory reasons for it; and in general, not without consultation and agreement with a medical brother, for it is too grave and solemn a thing to exercise this professional authority as by the *fiat* of an autocrat. In those instances in which it becomes necessary, during the life of the child, to resort to this mode of delivery, the most formal consultation ought to be regarded as indispensable; and no consultation can be supposed properly to result in such a proceeding, except upon the most urgent and clearly understood reasons for it. There are gentlemen in the profession who boast that they never have performed this operation. It may be very true; but the reason is that they resolutely decline to do their duty, which they throw upon some not more unfeeling, but more merciful and resolute brother.

There are cases of labor occurring in women with deformed pelvis that are plainly impracticable with an unmutilated child. For example, if a woman have the pelvis occupied with an exostosis, or if the diameters of that canal are changed and spoiled by rachitis or by malacosteon, the child contained within her womb cannot escape whole *per vias naturales*. If the promontory of the sacrum comes within two inches and a half of the symphysis pubis, the child cannot pass the strait alive, because its own smallest diameter is more than three and a half inches; and indeed, if the pelvis have three inches of antero-posterior diameter, it cannot be born alive, unless it be uncommonly small, and moreover possessed of a very incomplete ossification of the cranial bones, and great laxity of the suture lines that unite them: such a head might, by long pressure under a very powerful womb, be at length forced down through the strait, after it should have been moulded into the proper form by the force applied to it. Yet, when we come to consider that the bi-parietal diameter is 3.88 inches, we shall entertain little hope of getting the head down, in a pelvis of three inches. It is very true that Solayrés, and Dugés, and others have been fortunate enough to meet with cases in which the head at term has been born in a pelvis of two and a half inches from front to rear; but it is not to be expected that success can attend labor in a female whose pelvic deformity even approaches to two inches and a half in its smallest line of diameter. The exceptions but prove the general rule. (See *Monthly Journal Sci.*, July, 1847, for Dr. Simpson's case.)

Such a pelvis is not fit for the forceps, since it is too small for them to be withdrawn when locked. The question must always be, in such cases, as between the perforator and crotchet on the one hand, and the Cæsarian section on the other. But this can only be considered as relative to the living child, even by the warmest advocates of the hysterotomy. Of the dead child, no question can arise as to the mode of its delivery, except that of the perforator, and whether sooner or later. The dead child must always be withdrawn *per vias naturales*, if there be space through which to extract it with equal safety. But even where the child is known to be dead, we may be compelled to perform the Cæsarian operation, if we would deliver the woman at all; since deformity may reach to the degree of shutting up the passage, even against the perforator. There is, in the museum of the University of Pennsylvania, a pelvis so distorted, that the hand could not possibly have directed an instrument to the head, in a manner to enable the surgeon to open and extract it. The woman from whose remains the pelvis was taken died in the almshouse, resolutely rejecting the Cæsarian operation, and preferring to it the death which she knew to be inevitable.

The practitioner who may be in charge of a case of labor where embryulcia is indicated, must be guided by his judgment and the counsel of his medical brother as to the signs which compel him to undertake the delivery. I have already enumerated them—and they are easy to be understood. There is, in general, far more danger of the operation being deferred too long, than of its being performed too soon; since, if it be not performed in time to save the life of the mother, it would be as well not to do it at all. I know that, in uttering this sentiment, I am liable to the imputation of wantonly encouraging the use of this dreadful operation, but I wish to disclaim such an intention. Any one possessed of a mere common humanity would instinctively recoil from the performance of such an office, and no man can have read the eloquent appeals of Alphonse Leroy on this subject without feeling that he was right, in advocating the cause of mercy. I hope that no man living is reasonably more reluctant than I am to use any obstetric instrument whatever; and I fear that the resort to its employment is often had very unnecessarily and rashly. But I think that, when the case under consideration arises, we ought to act so promptly and so understandingly, that we may, on the one hand, derive a perfect success from it, and on the other stand acquitted, in our own judgment and in that of others, as well as before God, from the charge of any rashness or precipitation. I shall strive, therefore, while I reiterate the opinion, to clear myself by repeating that all such cases require a medical consultation. To mutilate the child, and then lose the mother, is a real misfortune, both for the practitioner himself and for the profession, which, from such results, is in danger of falling into disrepute. Let the Student read the memoir of M. de Broqua (*Mém. sur un Accouchement Laborieux*, Paris, 1824), in order to learn what danger may be incurred by the professional man, who even, assisted by a respectable consultation, terminates a labor by embryulcia. He will find that that gentleman, though evidently guided by the purest lights of science, and by a good and clear conscience, was led into the greatest straits and anxiety by the unfortunate termination of the case. I wish that every Student might be as cautious as M. de Broqua in regard to the consultation, under such trying circumstances.

It is to be understood, then, that where all other instrumental means fail—where, after due reflection upon the circumstances that hinder the delivery, a conclusion is formed that the mother and child must both perish, unless the latter be withdrawn by the assistance of instruments that mutilate it—where the Cæsarian operation is inadmissible, or rejected by the patient, we have the remaining and very sure resource of the operation of embryulcia, or embryotomy; and we can venture to encourage and cheer the unhappy and suffering female with the prospect of speedy relief by its means.

I have had occasion to feel, in common with many other practitioners, how dangerous an instrument is the sharp crotchet. The force to be spent on it, in extraction, is so great that, should the point slip or tear out from the bone, it is always jerked downwards several inches, and is very apt to catch in some of the soft parts of the mother, which it ploughs up and lacerates. How easy it would be to lacerate the vagina, or even the lower part of the womb, by the slipping of the point; and nevertheless, he who uses the crotchet, and is perfectly aware of the risk, is under the necessity of running that risk whenever he takes the instrument in his hand to deliver with it. There is no part of the cranium to which it can be applied without some hazard of its losing its hold. This is more apt to occur, from the faulty manner in which the crotchet is generally made, namely, with iron and not with steel. With a point of soft iron there is no real security; because the point soon becomes dull, and does not maintain its hold of the bone. The point ought to consist of well-tempered steel, and should be made as sharp as possible—but very much beveled, and quite short.

There is a vast variety of instruments prepared for the delivery of the head in cases of deformed pelvis. Dr. Davis of London has invented a great number of them, some of which I have had occasion to use, but with less satisfaction than I expected to have, from the strong recommendation bestowed upon them. I am now well convinced that a great apparatus of this sort is not at all necessary, as I think will be conclusively shown in the sequel of this article, in which I shall describe an instrument capable, with the occasional aid of one sharp crotchet and a perforator, of effecting the delivery of the head in the most restricted pelvis from which delivery is at all possible.

As this volume is not designed to be drawn out to a great length, I am constrained to make many of the remarks that I could otherwise find occasion to offer, more brief than is compatible with a copious detail of the subjects. But, notwithstanding this necessity, I am induced to give at length the history of a case of labor in a deformed pelvis that was under my notice in the year 1831. It was drawn up by my friend Dr. George Fox, now surgeon of the Pennsylvania Hospital, and published in the *North American Medical and Surgical Journal*, vol. xii. p. 484. It may, perhaps, serve sufficiently well to set forth the difficulties and embarrassments with which such cases are surrounded, and the success of it, probably the most difficult obstetric operation ever successfully performed in this country, may encourage those who shall hereafter have the misfortune to contend with similar cases, to hope for success in the midst of the greatest obstacles. I consider it more instructive than any merely didactic remarks that I could compress into these pages.

Case of Embryulcia for Deformed Pelvis.—"On Tuesday, June 14, 1831, I was called, about seven A. M., to see Mrs. R———, in labor with her first child: this is stated to have commenced about one A. M. The pains, as are usual in the commencement of labor, very feeble, short, and at about ten minutes' interval. Upon examination per vaginam, the projection of the sacrum was immediately felt. Not, however, suspecting the deformity which was subsequently found to exist, this was not at the time particularly attended to; the os uteri was sufficiently dilated to admit the finger to feel the protruding membrane. I was struck with the form of the sacrum: the rectum being very much distended with feces, I thought it might, in part, be occasioned by this. Directed ol. ricini one ounce, which was taken immediately. At noon found, upon examination per vaginam, that the membranes had ruptured, the head presenting: she was not aware at what time the waters had escaped. In the evening, the rectum being unloaded by the operation of the oil, I made a more minute examination, and was sensible of great deformity of the pelvis, though not to the extent we afterwards ascertained, the pains not being at all active. As it was late, I determined not to ask the assistance of my medical brethren till the following morning; therefore directed an anodyne (which I subsequently ascertained was not taken, from her dislike to laudanum, and fear of its retarding her labor), and left her for the night. Was called up about one o'clock the next morning, her pains being more frequent and stronger; found the os uteri rather more dilated, and the external parts very rigid, preventing an accurate examination of the pelvis. I remained with her some hours; subsequently called upon Dr. James, late Professor of Midwifery, &c., in the University of Pennsylvania, who met me in consultation at half-past eight A. M. In consequence of the rigidity of the soft parts, we found it impossible to make any satisfactory examination; we therefore concluded it best she should be bled, and take an anodyne—that we would meet in the afternoon: she was accordingly placed erect in bed and bled to incipient syncope, which was after losing about fifteen ounces; twenty drops of laudanum were soon after given. In the afternoon Dr. James again saw her: from as accurate an examination as we were capable of making (for the external parts still continued rigid, though somewhat relaxed since the bleeding), we came to the conclusion that there were not at most three inches in the antero-posterior diameter; that laterally there was rather more room, on the left more than on the right; the posterior lip of the os uteri was swollen and succulent, forming a cushion in front and a little below the projection of the sacrum; the head was presenting to the left side—its exact position could not be determined. On account of the unusual interest of the case, Drs. Meigs and Lukens were invited to attend; Dr. James, not feeling quite well, did not meet us that night. The result of the examination of these gentlemen was, that there was not more, if as much, room at the superior strait as we supposed; they coincided with us in the opinion that it was impossible the child should be born alive *per vias naturales:* our next object, therefore, was to ascertain whether or not the child was living; this was rendered certain by the application of the stethoscope; the pulsations of the child's heart were distinctly perceived, whilst the placental souffle was also very evident; the pains continued as they had been most of the day, recurring every four or five minutes. We remained with her some hours, when we ordered her an opiate, and agreed to meet at four A. M. The result of this meeting was, that, as the proper means of proceeding were of such immense importance, further advice should be had, and that we should meet at half-past eight o'clock A. M. Dr. Physick was called on, but was confined to the house by sickness; Dr. Dewees was also called for, but was absent from the city. At half-past eight A. M., Dr. James met us, Dr. Hewson being added to the consultation: it was agreed, as before stated, that it was impossible the female should be delivered of a living child *per vias naturales;* the question then was, whether the child should be sacrificed to save the mother's life, or an attempt made to save both mother and child. It was concluded, as the strength of our patient was good, her pulse only eighty-four and strong, as there were no symptoms of constitutional irritation, no injury would result from a few hours' delay; we therefore separated to meet at twelve M.

"The consultation was held at the appointed hour. By this time, after repeated and the most accurate examinations that the case admitted of, we were unanimous in the opinion that there were not more than two inches in the antero-posterior diameter, most probably only one inch and three-quarters. The different methods of proceeding which have been proposed in similar cases were duly and maturely considered, namely, the division of the symphysis pubis, the Cæsarian operation, and cephalotomy: the first was considered inapplicable to the present case; the Cæsarian operation was thought to be attended with so much risk to the mother as almost to be necessarily fatal, some of the most distinguished surgeons being decidedly opposed to its performance. Dr. Physick, who was called upon in the course of the morning by Dr. Meigs and myself to ask his opinion on the propriety of this operation, was decided and positive in his opposition to it. Under the weight of such authority, the idea of the Cæsarian operation was abandoned. It was therefore concluded, after the most mature deliberation, and upon viewing the case in all its bearings, that the life of an imperfect being (for it was again ascertained that the child was living and apparently vigorous) should be sacrificed to save the life of a wife and daughter, and that the operation should be immediately commenced, by opening the child's head, breaking up the brain, and allowing some hours to elapse before attempting extraction. At my request, with the approbation of our colleagues, Dr. Meigs consented to perform it. Drs. James and Hewson, having professional engagements, were at this time obliged to leave us, to meet again at six o'clock P. M. Preparatory to the operation, the rectum was unloaded by an enema, the urine drawn off by a catheter, and an anodyne administered; her pulse was one hundred and four. The consent of the patient, her husband, and friends, having been obtained, she was placed at the foot of the bed (which had previously been adjusted), the hips being on the edge, so that the perineum was perfectly free, an assistant supporting each leg. Dr. Meigs then took his seat directly opposite; made another examination preparatory to beginning the operation. After having some time carefully examined, he called me, and subsequently Dr. Lukens also, to make another examination, the result of which was that the operation of cephalotomy, if not altogether incompetent to the delivery, would be attended with as much risk to the life of the mother as the Cæsarian operation: it then appeared to us impossible that the cranium should be removed and the base brought through the superior strait, without the most violent exertions and great danger of lacerating the cervix uteri, vagina, &c.; that, taking this view of the case, it was better to call our colleagues again together, at as early an hour as possible, to reconsider the propriety of performing the Cæsarian operation: the child was again ascertained to be alive.

"Accordingly, at five P. M. we again met. Dr. J. Rhea Barton at this time saw our patient. Our first object was to ascertain respecting the life of the child, and upon applying the ear and the stethoscope, no pulsation was perceptible in any part of the uterine region; it was then unanimously agreed (the female not having felt the child for two or three hours) that it was dead: there was now no further hesitation as to the propriety of cephalotomy, which was immediately performed by Dr. Meigs, who employed the utmost assiduity and care in the management of the operation, on whose skill and unwearied attention the success of it is mainly dependent. To him I am also indebted for the following account of the difficulties, &c., which were experienced in the accomplishment of the delivery of the child.

"'The woman being conveniently placed on her back, with the perineum projecting beyond the edge of the bed, and the legs and feet properly supported by an assistant on each side, I took my seat for the purpose of proceeding with the first part of the operation, the perforation of the cranium.

"'A suture crossed the pelvis from front to rear, but its edges were overlapped, and could afford no facilities for the operation. This suture was the right leg of the lambdoidal, as was afterwards ascertained.

"'With Holmes' improved perforator, I endeavored to penetrate the solid bone in the centre of the strait, but, owing to the narrowness of the passage, and the constant interference of the os uteri, the lips of which were nearly in mutual contact antero-posteriorly, I dared not to give to the instrument that rotatory or drill-like motion which was necessary, for without such a movement it was impossible to make any progress, as the head rose upwards and rolled freely in the superior basin whenever any considerable pressure was applied by the perforator, though the womb seemed to be pretty firmly contracted at the same time.

"'Finding this mode of proceeding unsafe for the woman, I begged permission to leave her a few minutes in order to procure an instrument better adapted to the purpose in hand. Accordingly, Mr. Rorer furnished me with a large trocar, and having guided it with two fingers to the proper situation, and kept it securely by retaining the fingers in contact with the head, I was able gradually to drill a hole through the bone, the head being pressed from above against the strait by Dr. Lukens. Two other perforations were made near to the first one, in the same cautious manner; after which, I again introduced Holmes' scissors, and, having opened them, found that I had made an incision of about an inch and a half in length. Through this a slender blunt-hook was introduced into the cavity of the cranium, and the brain very freely broken up.

"'The poor woman, who was already much exhausted by many hours of labor, now took an anodyne and was left to her repose, in order that the medullary matter might be gradually pressed out, and the cranium allowed to collapse so as to come more in reach of the instruments.

"'At ten o'clock P. M., I again met Drs. Fox and Lukens, and the patient being disposed as before upon her back, I introduced a crotchet into the cavity of the cranium, and spent some time in extracting the medullary substance, not much of which seemed to have been expressed during our absence; the head still continued lying upon the superior strait, except a portion of the hind head, which was pressed down towards the excavation to the left of the promontory, where there appeared to be the largest space.

"'Having removed a considerable quantity of the cerebral substance, I fixed the tooth of the crotchet into the cranium, and guarding it on the outside with a finger, exerted a very great amount of force, which had not the least effect in drawing it lower down.

"'It soon became evident to me, from several trials of this kind, that no exertion of mere strength could be of any avail to drag away the head, and that, if it was to be delivered at all, it must be piecemeal: but, as the child had been dead only a few hours, and its skull bones were still firmly united to their inner and outer membranes, it will be readily conceived that the removal of the bones was a most difficult matter, not only on account of the firmness of their connections, but also on account of the narrowness of the passages, the great hardness of the skull, and the great danger of wounding the parts by the slipping of the crotchet, which, under the circumstances, could be best applied on the interior of the skull, and from the swollen and succulent state of the lips of the os uteri, whose inner surfaces were now in close contact, and presented to the touch the idea of a long fissure instead of preserving a round or oval form: last and not least, the perineum was so strong and unyielding, that the greatest inconvenience arose from its pressing the fingers against the arch of the pubis with such force, and by long continuance so painfully, that no one could endure for any great length of time to keep up the necessary extension.

"'Being possessed of one of Dr. Davis's osteotomists, I expected to derive great advantages from its employment in the case, and accordingly introduced it with the view of cutting away portions of the bone; but the constricted state of the parts rendered it impossible to make use of it consistently with a humane regard to the safety of the patient.

"'Having ascertained, then, by fair experiment, that mere force could do nothing in the delivery, I resolved to pursue the intention of breaking up the head by means of the crotchet; and it was with great fatigue to the woman that I picked out altogether about as much as would equal the size of one of the parietal bones, the portions consisting of fragments of the right parietal and part of the frontal bone.

"'Finding, towards morning, that the progress of the operation was exceedingly slow, I went out and procured a pair of straight tooth forceps, with which I could take a firm hold of the bone and twist off portions, which, after they were broken away, often took a good while to separate from their adhering membranes.

"'At four o'clock the woman was so much fatigued that we agreed to give her an anodyne draught, and leave her to recover strength by means of a few hours' rest.

"'The attempts at extraction had now continued from ten o'clock P. M. until four A. M., and I think the whole of the bone removed would not much exceed in quantity one parietal bone at full term. I believe it was impossible to proceed with greater rapidity, and I often admitted a doubt whether I should be able to deliver her before death should come to her relief.

"'Throughout the day, on Friday, the attempts at extraction were repeated, in presence of the gentlemen last named, and also of Drs. James and Hewson, who became fully satisfied that no greater progress could at present be made, considering the circumstances of the woman.

"'Early in the afternoon, symptoms of fever became very manifest; the pulse rising to one hundred and twelve strokes in the minute, with considerable firmness and volume; this state of the circulation being coincident with a distressing eructation, partaking somewhat of the character of singultus, and a great distension of the abdomen, as well as of the womb itself, from gases extricated within them. She complained also of great soreness of the belly, on which account she had it bathed frequently with cold vinegar and water, leaving the surface exposed to the air, which was a great solace to her.

"'In order to counteract this new state of things, she was bled six ounces, and took a portion of castor oil.

"'Dr. James, who had witnessed in the morning the difficulty with which the extraction of portions of the cranium was effected, was good enough to supply me with a complete set of Dr. Davis's craniotomy forceps, and returned to the house in the afternoon to our assistance. These instruments were applied, but they were incapable of effecting so much as even the straight tooth forceps. The teeth of the instrument could not be made to penetrate the skull, although most accurately adjusted; and notwithstanding the handles were brought so nearly together, that the style on the one handle went quite to the bottom of the socket in the other, every attempt to extract with them resulted in the slipping of the bone out of the gripe of the instrument; a proof at once of the hardness of the bone, and of the impossibility of bringing it down in its then condition.

"'Putrefaction now rapidly advanced, as indicated by the odor of the discharges, and my only hope for the escape of the patient rested on the opinion that she might be supported a few hours, until the softening of the tissues should enable me to draw down larger portions of bone by admitting of the pericranium and dura mater being peeled off with a finger-nail, while the bone should be secured, and drawn down with the forceps or crotchet.

"'But such was the unpromising state of affairs that the poor creature resolutely refused to make any further effort to escape, saying she knew that she must die, and would rather die than exert herself any further, and begged in the most piteous tones that all further attempts to deliver her should be abandoned, yet expressing her thanks for the efforts that had been already made.

"'She was at times slightly delirious. After explaining to her the increased facility which began to exist from the rapid decomposition of the fœtus now going on, and endeavouring to reassure her with a promise to deliver her in the course of the night, she was again left to rest three or four hours under an anodyne draught. During the whole period that has now been spoken of, the anterior lip of the os uteri was behind the triangular ligament of the pubis, and the posterior one low down beneath the promontory, and strangulated, as it were, or buttoned by the part of the head that lay on the strait and partly within it; yet so swelled that their inner surfaces continued nearly in contact, except when parted by the introduction of the fingers.

"'The perineum seemed to have acquired no disposition to relax, notwithstanding all the handling to which the parts had been subject; and, excepting that the bones were more easily detached now than before, no greater comfort or facility was enjoyed by the operator than at the commencement.

"'At ten P. M. I again met Drs. Fox and Lukens, and the patient, after much entreaty and argument, resigned herself unwillingly to the further prosecution of our attempts to deliver. The remains of the head was still high up, but some of the broken edges came lower down. I got hold of a piece that descended behind the pubis, and with the tooth forceps pulled it downwards, detaching the membranes as it advanced, and found that it consisted of all the remainder of the right parietal bone. I next got away nearly the whole left parietal, and afterwards with the crotchet removed first the right, and then the left orbitar portion of the os frontis, which was all that remained of that bone. I then got away with the crotchet and forceps the right superior maxillary, and afterwards the left superior maxillary bone. I subsequently twisted off the greater part of the broad portion of the os occipitis, and the squamous parts of the temporal bones; so that I had nothing left now but the base of the skull and the lower jaw, which latter I left as a point on which to exert the tractions that were soon to be required.

"'If the estimate made by all the gentlemen, that the strait was not more than two inches in its antero-posterior diameter, should prove correct, I was fearful of meeting some difficulty in bringing the base of the skull, which was two and a half inches, through it; but when I had reduced the head so as to leave nothing more than the base of the skull and the lower jaw, I fixed a blunt-hook into the latter, and, with a finger to antagonize it, drew the mass down towards the point of the coccyx, and had the satisfaction to find that it was got quite through the strait. My hand being now introduced into the vagina, I got a firm hold of the neck, and with the exertion of the greatest strength, gradually brought the button-like remainder of the head out at the vulva, while the point of the thorax, of course, was entering the narrow pass. The head was delivered at a quarter after one o'clock, and having succeeded in effecting the most difficult and dangerous part of the operation, we gave her some ergot; then fastening a twisted towel round the neck of the fœtus, I renewed the extractive efforts, which in twenty minutes enabled me to deliver the shoulders, and in twenty minutes more, the hips—the child being completely withdrawn at five minutes before two o'clock, which was forty minutes after the head was delivered.

" 'I found that, under the stimulation of the ergot, she was enabled to bear down very strongly, considering her exhausted state, and at all events the chief object of its exhibition was secured, namely, a firm contraction of the womb, and an effectual separation of the placenta, which came into the os uteri soon after the delivery.

" 'Large quantities of gas of the most putrid odor followed the extraction of the child, showing the enlargement of the womb, before spoken of, to have been owing to its extrication by the putrefactive processes going on in the uterine cavity.

" 'The cord was shrunk and black, and the placenta, which was likewise black, and so filled with air as to crepitate under the fingers, was so horribly noisome that it was scarce possible to endure the stench during the requisite handling of it. No blood followed the placenta.

" 'The body was soft and putrid, being completely emphysematous and crepitating like the placenta. The cuticle was peeled by the pressure and friction.

" 'The child was rather above the medium size.

" 'After washing the poor creature with a sponge dipped in claret and tepid water, and making her as dry and comfortable as possible, she got an anodyne and was left to rest, being unable to speak above a whisper, and with a pulse feeble, but beating only one hundred and two strokes per minute.

" 'The whole difficulty in delivering a child through so contracted a pelvis can scarcely be conceived of by one who has not been engaged in such an operation. The constant and perplexing apprehension of injuring the mother, either with the instruments employed, or with the sharp and ragged edges of the bones which must be withdrawn, and sometimes violently broken off with the sharp tooth of the crotchet, involves the operator in the most painful and unremitted attention and watchfulness, which alone, when long continued under compulsion, is real torture. The confusion also in the parts, arising from the ragged remains of the scalp and the inner and outer membranes of the cranium blending themselves, as it were, with the swollen lips of the os uteri quite in mutual contact, and covering and concealing the bones, is a source of great embarrassment, where those fibrous tissues retain so much firmness and compactness.

" 'Doubtless, could we have known that the woman would have been able to bear the fatigues of labor so long, we should have deferred the efforts at extraction for twenty-four hours after the perforation of the head; but such was not the opinion to be gathered from the actual phenomena.

" 'It has been seen that no great loss of time took place, after the softening of the tissues rendered it possible to break them up with some facility, whereas the process previously was exceedingly slow and tedious. The perforation was deferred as long as possible, which saved us from the dreadful and cruel operation of cephalotomy in a living fœtus. The child died from long-continued pressure.'

"June 18th (Saturday), nine A. M. Our patient says she feels quite comfortable; had some sleep after we left; pulse one hundred and twelve, rather more feeble; skin moist, tongue slightly furred; clean linen, &c., was put on her, and she was moved up in bed. The bladder was emptied by the catheter; fomentations with flaxseed mucilage directed to be applied to the vulva; the most perfect rest and quiet strictly enjoined; as diet, arrowroot and oatmeal gruel, tea and toast.

"Evening. Remains much the same; bladder again emptied; mucilages continued; an anodyne to be given at ten P. M., if at all restless.

"19th, nine A. M. Passed a comfortable night, pulse ninety-four, skin pleasant, tongue slightly furred, lochia almost natural; free from pain; slight soreness over pubes to left side; directed warm brandy to be applied over soreness, a Seidlitz powder to be given, and repeated, if necessary; continue other means.

"Evening. Medicine not having operated, an enema of warm flaxseed mucilage was directed, and an anodyne at bedtime.

"20th. Rather restless in the early part of the night; enema operated freely; feels very comfortable; no pain; pulse seventy-six; skin pleasant; tongue continues slightly furred; countenance good; spirits cheerful; continue as before.

"23d. Our patient continues to do well, usually rests well at night; free from pain, although the soreness in uterine region continues; secretion of milk copious; feels so comfortable that she has taken an infant to nurse; pulse rather more frequent than natural; tongue clean and moist, bowels costive; passes urine without difficulty—the catheter was used three times daily till last evening, when it was found to be unnecessary; lochia serous; directed ol. ricini one ounce. Mucilages to vulva to be continued, mucilaginous injections per vaginam; continue diet, and perfect rest in horizontal position.

"From this time our patient continued rapidly to improve; in three weeks from the time of her delivery, was so well as to be permitted to go down stairs, and in a short time resumed her ordinary avocations.

"The subject of the preceding case is a native of Ireland, aged about twenty-two years, of small stature, not exceeding four feet and a half; is stated to have been a healthy child till her third year, when she received an injury by a fall, after which she was unable to stand or walk for two or three years; at the expiration of this time she regained her strength, and was subsequently considered an active child. Upon examination, we found the femur and tibia of each extremity very much curved, forming a considerable arch forward; at the lower part of the spine, there was a cavity sufficiently large to admit the hand corresponding with the promontory of the sacrum internally; the bones of each arm partook of the general disease. It was evident she had in early life labored under rickets."

Such is the history of Mrs. R.'s labour by my friend Dr. Fox. It was the most difficult case I have had during a long career. I hope the account above given may serve to instruct the Student better than any mere didactics could do. The case taught me one useful lesson, viz., that the crotchet, or *uncas*, which was for many centuries the woman's instrument, is a detestable thing; and that a better one was wanted. That better one I learned to supply; and in doing so, I have made a valuable contribution to our art.

In all cases where the diameters of the pelvis have been so much diminished by rachitis or mollities ossium as to render the descent of the fœtal head impracticable, it has been the universal custom either to perform gastrotomy, or to lessen the size of the cranium by evacuating its contents, and then extract by means of the sharp crotchet. The method last spoken of is, perhaps, a good one, where the diminution of the pelvic passages is not too considerable: nevertheless, we find, upon reference to the records, that a great many women have been victims in such untoward labors, owing, measurably, to the violence done to the soft parts during the forcible extraction of the head, insufficiently reduced in size to admit of its transmission with safety to the mother—and probably in no less degree to the wounds that have been inflicted by the slipping of the crotchet.

The firm bony structure, composing the base of the fœtal skull, is nearly two inches and a half in its transverse or smallest diameter; mere excerebration, therefore, cannot be regarded as furnishing a good security against fatal contusions from the forcible extraction of such a body from a pelvis whose smallest diameter is not exceeding two inches in length. Such a body as the base of the skull must, in order to pass through such a pelvis, present itself in an inclined attitude, or with a dip; but this dip or inclination can be only imperfectly communicated to it whilst all the bones of the cranium retain their connection with each other. To enable such a base to pass downwards safely, the skull must be taken to pieces, and those pieces removed in succession. In some instances, this successive ablation of the cranial bones has been effected by the crotchet, the point of which was used to pick out the bones, sometimes in portions not larger than the finger nails; as, for example, in Elizabeth Sherwood's labor, impressively narrated by Dr. Osborne. Those who have perused that account will remember the extreme perplexity of that practitioner, and the infinite pains he took in his anxiety to avoid injuring her with the crotchet. He could not get the base of the cranium down until he had removed all the rest of the head.

Having had occasion to observe the difficulties and perplexities arising from labor in deformed pelvis, as they occurred in Mrs. M. R., the case above related, whom I have now delivered in two accouchements, I venture to lay before my professional brethren the impressions I derived from observing and conducting those two labors.

There is reason to believe that no other female has ever been safely delivered in this country, under the disadvantages of a pelvis measuring only two inches from sacrum to pubis, which, by the judgment of persons of the highest claims to confidence, is the extent of Mrs. R.'s case. I speak this, however, under liability to correction. All the gentlemen then consulted, agreed that the diameter was as above mentioned.

Her second accouchement took place in the month of June, 1833, the child having reached the full term of utero-gestation, an event which I greatly deprecated, having vainly urged, with the concurrent advice of Dr. Dewees, the operation for inducing premature delivery.

The experience I had acquired in delivering her in the first labor convinced me that the crotchet was not to be relied upon in her case; not only because of the danger from contusion in extracting the skull, and from wounds made by the point of the crotchet, but also from the loss of time requisite for picking out the head bit by bit. The patient had almost fallen a victim to exhaustion in the first labor.

In reflecting upon the facts that had occurred in 1831, I found that the problem about to be solved in the second labor was not, a head being retained above a pelvis too small to transmit it, to extract said head—but the question was, to extract said head with the smallest loss of time, and least possible risk to the mother. I had *already ascertained* that the Cæsarian operation would not be submitted to.

I supposed that the head might be four inches in its bi-parietal diameter, and I knew that the plane of the pelvis was only two inches. Under such circumstances, the vertex will not present, but the crown of the head will be the presenting part: but since the cranium cannot recede farther than is necessary to bring it in close contact with the posterior part of the mother's abdomen, there will be two inches of the head lying upon the plane of the superior strait, and two other inches projecting in front of the symphysis pubis; or, in other words, the crown of the head will repose upon the top of the symphysis pubis—part of the head being behind, and part in front of that bone.

There is a very important principle in the management of such a case, which is, that all that part of the cranium which lies in contact with the mother's back, is perpendicular to the opening of the strait, and may, when the skull has been opened, be seized with a straight forceps or pliers, like that represented in the engraving Fig. 128; whereas, all that part of the skull that lies horizontally over the opening, can be taken hold of with a curved forceps or pliers, Fig. 129. Long before the occurrence of Mrs. R.'s second labor, I caused the proper instruments, Figs. 128, 129, and 130, to be prepared by Mr. John Rorer, the eminent surgeon's instrument maker. Aided by means of this apparatus, I encountered but little difficulty in delivering this patient, whose first accouchement had cost me so much toil and anxiety. The invention is my own. I published it soon after the event spoken of, in Baltimore, and it is now known and used in this country as my embryotomy instruments. Neither Mulder nor any other author has described or proposed it. I look upon it as a most important contribution to the Operation in Midwifery. In a great majority of the cases, it wholly supersedes the crotchet, and mitigates the danger of the embryotomy operation in a remarkable manner. I am glad to believe that it has got into a very general use in this country, and I hope it will in the end entirely supersede the most detestable of instruments, the sharp crotchet.

Fig. 129.

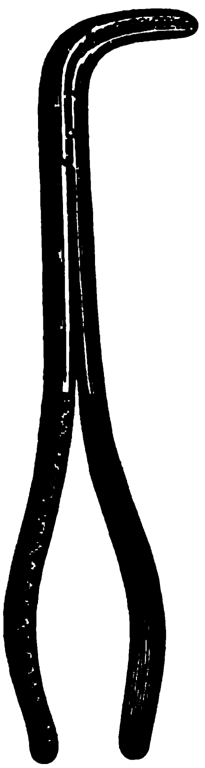


Fig. 128.

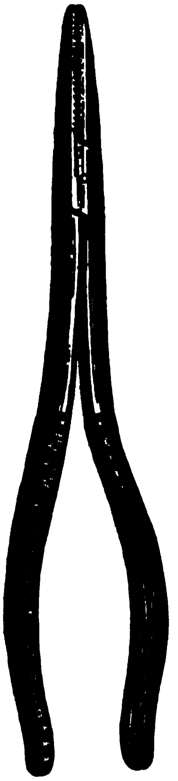
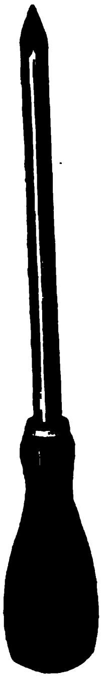


Fig. 130.



I may properly be allowed to express the surprise which I experienced in finding my just claim to the invention of this most useful instrument treated without due regard, in quarters from whence the greatest liberality might have been hoped for in acknowledging the authors and inventors of things that contribute to the perfection of our art.

I have found, upon applying the test of practice, that when the thin portions of the cranial structure are taken hold of, either with the straight or curved forceps, they can be broken up with great ease, and removed with sufficient celerity; so much, indeed, that a head may be reduced to a very small remainder in a short time. I believe that if early arrangements are made for delivering the patient by this method, no danger will exist of exhaustion or excessive constitutional irritation being produced before the extraction of the fœtus can be completed.

From the foregoing remarks, it seems to be very clear that the practitioner, in undertaking to deliver a patient with excessive distortion of the pelvis, ought to proceed to his operation with a full understanding that, after perforation, he is to remove all the posterior parts of the presentation with the straight pliers, and all the anterior and lateral ones with the curved pliers; making attempts, from time to time, to draw the head down, as he finds reason to believe that it is sufficiently broken up and collapsed. Such are my views of the mode that ought to be adopted. I, at least, am fully of opinion that Mrs. R. could not have been rescued by me, had I relied only upon the crotchet for her delivery: with my embryotomy forceps, I should not hesitate to promise to deliver speedily in a pelvis of two inches.

It is proper to observe that the female constitution suffers less in the first hours of labor, in which the head cannot engage, than in those wherein the head sinks *low* into the excavation. This depends, in part, upon the well-known principle, that the contractions of the womb are violent and powerful in proportion as that organ becomes smaller or more condensed. If the head becomes arrested in the excavation, and particularly after having wholly escaped from the uterine cavity, it is urged with great power upon the tissues, which resist its further descent. Under such circumstances, constitutional irritation is rapidly developed; whereas, under the more lenient exertions of the uterus, while the entire fœtus is still contained within its cavity, not only is the impulsion of the head against the resisting tissues far more moderate, but during the intervals between the pains the pressure ceases. Hence a woman remains long in labor, with little constitutional disturbance, in the kind of cases I am discussing. These observations are illustrated, and their truth confirmed, by reference to some of the most celebrated examples of such labors, which are recorded in the books.

Whenever, therefore, a woman, who is known to have an impracticable pelvis has fallen into labor, and in whom the Cæsarian operation is rejected—if the perforator is to be resorted to, it should be applied as soon as possible, in order that, the child having ceased to exist, all the facilities derivable from incipient decomposition of the fœtus may be enjoyed. Twenty-four hours after the death of the fœtus, the firmness and cohesion of its soft parts are so much lessened by maceration in an elevated temperature, equal probably to 99°, that the extraction of the pieces of bone becomes comparatively easy. I should, therefore, in such difficult cases, recommend that all attempts to deliver should be delayed, if possible, for twenty-four hours after the perforation of the head. This recommendation is founded on what I have experienced of difficulty in getting out the portions of bone after I had broken them up, when I made the attempt antecedently to the occurrence of signs of decomposition. The patient can be quieted with anodynes, and supported with light nourishment, and, if needful, may, by venesection and cold drinks, be kept tolerably free from vascular disturbance during the whole period of such delay as may be deemed advisable.

The engraving, Fig. 130, shows the form of the perforator that I employed in Mrs. R.'s case. It is a trocar or drill, ten inches in length from the handle to the point. I recommend it to the attention of the Student as a good instrument for making the perforation in those cases where he can by no means find a fontanel or suture. He ought to notice that, in very great deformity of the pelvis, the lips of the os uteri, which will descend lower than the plane of the superior strait, will be brought so close together as quite to touch each other, and, therefore, he will not be able safely to use the ordinary perforator as a drill—the rotary motion would wound the mutually touching lips. But such a drill as Fig. 130 is devoid of this objection. I was obliged to make use of such means of penetrating the skull in Mrs. R.'s case, since no suture was practicable, and the common Smellie's scissors could not be made to perforate the solid bone; any direct pressure causing the head to roll, or move upwards, and any rotatory or drill-like motion with it, being impossible without great danger of wounding the lips of the os uteri. The same cut exhibits both the straight and curved pliers. They are eleven inches in length; the gripe is serrated, and the sides of the mandibles are rounded, in order that they may not pinch any tissues except those intended to be included in the bite, which, on account of the serræ, is very sure and strong.

I learned, after the events above described, that this patient again became pregnant; that the child presented the breech, which would make delivery *per vias naturales* absolutely impossible; that she was under the care of Dr. Nancrede of this city, and was safely delivered of a living child by means of the Cæsarian operation, performed by Professor Gibson of the University of Pennsylvania, assisted by the late Dr. Beattie, Dr. Nancrede, and others. In a subsequent or fourth pregnancy, I saw her, the history of which case was again drawn up and given to the public, in the *American Journal of the Medical Sciences*, by Dr. George Fox, to whom I am indebted for the relation already above given to my readers, and from whose interesting "*Account of a Case in which the Cæsarian Section, performed by Dr. Gibson, was a second time successful in saving both mother and child,*" I here cite a portion of that account with a view to make it more extensively known by means of this volume.

As Dr. Fox's paper is partly occupied with the preceding histories, I shall commence at p. 17 of his statement.

"Toward the latter end of August last, Mrs. R. called on me, and stated she had nearly completed the seventh month of pregnancy, and was desirous that I should again attend her: this I agreed to, upon condition that she would consent to the performance of any operation which should be deemed most advisable. Dr. Meigs kindly consented to attend with me.

"Premature labor, in her then advanced state of pregnancy, we considered would be attended with as much difficulty, and much greater danger to the patient, than at the full period.

"Under the impression that the Cæsarian section would be most proper, we endeavored to prepare her system for this operation, should it be concluded upon, by a regulated diet, such as would be least stimulating, attention to her bowels, &c.: accordingly, for some weeks previous to labor, her diet was restricted chiefly to milk and farinaceous articles.

"On Sunday, November 5, 1837, I was sent for by Mrs. R. about five o'clock A. M. On my way to her house, I stopped for Dr. Meigs. We found her laboring under a good deal of mental excitement, with a pulse of 116; countenance anxious and pallid; and apparently in a much more unfavorable situation than in either her first or second accouchement. Her pains had commenced about three hours previous to calling upon us; they were slight, recurring at an interval of about ten minutes; upon an examination per vaginam, the os uteri was found pretty well dilated, swollen, and succulent, as in previous labors; the head presenting to the left side of the pelvis; the membranes had been ruptured. Upon inquiry, we learned that on the evening of the Friday previous there had been a considerable discharge of water from the vagina, which continued throughout the following day; but, as it was unattended with pain, she had not thought it requisite to send for us; this discharge was not produced by any exertion on her part. After remaining with her some time, finding that her pains were not urgent, we concluded to meet at nine o'clock, and invite Professors Gibson and Hodge to join us in consultation.

"9 A. M. Met Drs. Meigs, Gibson, and Hodge. We found our patient much the same as when we left her, excepting that the pains were rather more urgent and frequent. Upon an examination of the case in all its bearings, we determined to advise the Cæsarian section, as best under the circumstances. I accordingly stated to the patient our views of her case, and after some little hesitation obtained her consent to the performance of this operation: previous to which, upon an examination of the abdomen, we were struck with the complete anteversion of the uterus; the old cicatrix was dark-colored, hard, and puckered, about five inches in extent; adhesion had apparently united the integuments and uterus for a space of four or five inches, from near the pubis up towards the umbilicus.

"We now ascertained, by applying the ear to the uterine region, that the child was living. Our patient's bowels having been opened by an enema, and her bladder emptied, she was placed upon a table protected by a mattress, on her back, with her hips at the edge, and the operation immediately performed by Dr. Gibson, in the presence of Drs. Meigs, Hodge, Norris, C. Bell Gibson, and myself. Dr. Norris and myself making firm pressure upon the sides of the abdomen to prevent protrusion of the intestines, Dr. Gibson commenced by making his incision with a scalpel, through the integuments, muscles, &c., extending from an inch and a half below the umbilicus, nearly down to the pubis, directly through the old cicatrix: the uterus was found connected with the integuments by strong adhesions, for a space of about four inches; the incision into this organ was made near the fundus, and extended down five or six inches; that portion which was adherent was much attenuated, being scarcely one-fourth of an inch in thickness. To ascertain the extent of these adhesions, Dr. Gibson with his scalpel dissected up the integuments on one side, until a knuckle of intestine protruding satisfied him of their extent, which might be about half an inch.

"When the section of the uterus was completed, the placenta was seen immediately under the line of incision, and partially detached by the separation of the lips of the wound. Dr. Meigs, standing on the left of the patient, now introduced his left hand towards the right side of the womb, displacing the placenta no more than was necessary during the exploration, yet detaching a considerable portion of it, as it filled the wound in the organ; he first extricated the left foot and hand, which were found near each other; the breech soon followed, succeeded immediately by the shoulders, and lastly by the head, after a few moments of resistance, by the contracting edges of the cut, which grasped the neck of the child, and the hand of the operator, with great force. The placenta was soon after removed through the incision, and the cord tied and cut: the hemorrhage from the uterus was at first considerable, but ceased upon the contraction of that organ, after the removal of the child and placenta. The external wound was brought together by six sutures (introduced from within outward), and adhesive strips, and a compress placed over it; a broad band, to support the abdomen, was now applied around it; the pressure of its sides, to prevent protrusion of the intestines, was continued until the external wound was closed.

"The child thus born was a boy of good size, but in an extremely feeble state: some time elapsed before perfect respiration was established, but happily the efforts of Dr. Meigs were completely successful, and all anxiety on its account ceased.

"Our patient bore the operation well, scarcely murmuring; in fact, she says, she suffered but little more than with one labor pain, her pains usually being uncommonly severe. Her position was not altered, excepting that her lower limbs were now supported by another table. Her pulse immediately after the operation was 96, just before 112. She is enjoined to lie perfectly still, not on any account to move; to be permitted to take nothing but small portions of barley water; and, in case there is much pain, a teaspoonful of the following: ℞. Sulph. morphiæ gr. ij; aquæ ℥i. M. ft. sol.

"Soon after the operation, Messrs. J. Forsyth Meigs and Skelton arrived; these gentlemen assiduously devoted themselves to our patient during the first five days and nights, so that, had any unfavorable symptom appeared, we should have had immediate notice.

"1½ P. M. Feels quite comfortable; after-pains very slight; pulse 80.

"4 P. M. Pulse 88; has taken one teaspoonful of morphia solution. 10 P. M. Met Dr. Meigs. Pulse 88; skin pleasant; gentle moisture; tongue clean and moist; some flatulence; not much soreness; after-pains moderate; urine drawn off by the catheter, six ounces; directed solut. morphiæ to be given every three hours if there is much pain, and a small portion of lime-water occasionally for the flatulence.

"6th, 10½ A. M. Met Drs. Meigs, Gibson, and Hodge. Mrs. R. passed a restless, uneasy night; was unable to sleep, though not in
n; took a dose of morphia at 11½ P. M., and another at 5 A. M.,
me-water twice. Her pulse is 85, and soft; skin pleasant; slight

distension of abdomen, without any increase of soreness; urine by catheter five ounces, of natural appearance. 1½ P. M. Symptoms all favorable; pulse 88. 4 P. M. Pulse 92. 8½ P. M. Met Dr. Meigs. Pulse 94; skin and tongue moist and pleasant; countenance good; no expression of anxiety; considerable tympanitis; complains much of flatulence; no after-pains; lochia free and natural; urine by catheter ten ounces. At this time, a catheter was introduced into the rectum, which caused the discharge of a large quantity of gas, rendering her much easier, and completely relieving the tympanitis. Directed a tablespoonful of the following mixture to be given every two or three hours: ℞. Bicarb. potassæ ʒij; sulph. morphiæ gr. ss; aquæ menthæ p. ℥vj. M. ft. sol.

"7th, 10 A. M. Met Drs. Meigs and Gibson. Our patient had a very good night; slept comfortably, without an opiate; pulse 78, and soft; countenance good; respiration natural; skin pleasant; tongue slightly furred, but moist; urine by catheter eight ounces. 4 P. M. Pulse 82; no pain or tenderness; has slept through the day; expresses herself as feeling comfortable. 8½ P. M. Pulse 84; no return of tympanitis since the introduction of the catheter into the rectum last evening; urine by catheter eight ounces; continued mixture.

"8th, 10 A. M. Rested well all night; secretion of milk natural; the infant was put to the breast during the night; pulse 100: skin pleasant, moist; tongue slightly furred, moist; urine by catheter eight ounces; wound was examined without removing dressings; suppuration is commencing; there has been throughout a slight oozing of bloody serum; she is this morning removed to another bed. 2 P. M. Pulse 92; secretion of milk increased so much as to cause some uneasiness to her; breasts are directed to be well drawn. 8½ P. M. Pulse 92; breasts relieved by drawing; urine by catheter ten ounces.

"9th, 10 A. M. Slept soundly all night; appears very comfortable; pulse 97; skin pleasant, moist; secretion of milk abundant; lochia natural; urine by catheter eight ounces. 6 P. M. Pulse 96; skin moist; abdomen flaccid, free from all pain or tenderness; no flatulence; urine by catheter eight ounces; directed the mixture carb. potassæ to be omitted; she had taken it occasionally, on account of flatulence, since the evening of the 6th; to-night, is permitted to take arrowroot gruel; has been restricted to small portions of barley-water until this time.

"10th, 9 A. M. Slept comfortably; having some return of flatulence, took two doses of potash mixture in the course of the night; relished gruel; external organs were washed with weak wine and water, much to her relief; pulse 104; skin moist; urine by catheter eight ounces. 1 P. M. Pulse 100; wound dressed for the first time; it extends from half an inch above the pubis to one and a half inches from the umbilicus; adhesion has taken place at the upper and lower ends; discharge slight, bloody, dark-colored; at the upper end of the cicatrix from former operation, on the right side of the incision, it is slightly inflamed, of an erysipelatous appearance, and ulcerated, for the space of two inches; I removed a stitch from this point, which seemed to be a source of irritation, also one from the upper end; washed the parts and applied fresh adhesive strips, leaving a sufficient space for the free escape of pus; a piece of lint, spread with cerate, and bandages were then applied; she complained of no pain or fatigue. Bowels not having been moved since the operation, an enema of warm flaxseed mucilage is directed; breasts, which are somewhat troublesome, to be well drawn; the child would nurse, but from the mother's position it is difficult and fatiguing; consequently, we rarely put it to the breast, having from the first had a wet-nurse for it. 6 P. M. Pulse 100; skin pleasant; no pain; all her symptoms are most favorable; urine by catheter ten ounces; enema not having operated, another to be administered.

"11th, 9½ A. M. Slept well, but in consequence of some pain in the evening, caused by the enema (which operated freely), she took two doses of morphia solution; pulse 96; tongue less furred; moist; urine by catheter eight ounces; abundant secretion of milk; no unfavorable symptom; slight dark-colored discharge from wound; fresh cerate applied; asks for increased diet; is to be allowed the soft part of six oysters and a biscuit, in addition to the gruel. 6 P. M. Pulse 96; urine by catheter six ounces.

"12th, 10 A. M. Rested well; took one dose of morphia; pulse 98; skin pleasant; has passed water twice through the night without the catheter; the wound looks well, healing; inflammation about the old cicatrix much diminished; I removed three more stitches, and applied fresh adhesive strips to lower parts of it; diet, milk, eggs, and oysters.

"13th, 10 A. M. Pulse 96; no pain; skin natural; tongue clean; slept well; wound looks well; removed the last suture, and applied fresh dressings.

"15th, 10 A. M. Has slept well for the last two nights; pulse 96, soft and pleasant; skin and tongue natural; countenance good; very cheerful; spirits throughout have been excellent. Wound looks well; adhesion perfect above and below; is filling up rapidly; inflammation of right edge subsided; suppuration moderate, lighter color; lochial discharge has ceased. This morning, for the first time, she complains of her position, which has been altogether upon her back; upon examination, a small slough (size of a cent) is discovered upon the sacrum; inquiry had frequently been made upon this point, but the fear of being moved induced her to conceal the pain and soreness until this time; her position is now being changed to the side, hips being protected by adhesive plaster; a poultice of bread and milk to be applied to slough; diet as before. 5½ P. M. Much more easy since change of position; pulse 92; has for the last two days suckled her infant.

"17th, 10 A. M. Pulse 84; bowels were opened yesterday by an enema; slough separating, superficial, does not complain of it; wound looks healthy; suppuration slight.

"25th. Has been very comfortable since last report; no pain or tenderness; pulse 88; wound nearly closed, a small opening merely remaining about the top of the old cicatrix; the discharge from it very slight; bowels being confined, she is requested to take ol. ricini ℥j; to-day is permitted to sit up in the bed.

"We have conceived it unnecessary to head each daily report, 'Met Drs. Meigs and Gibson,' we having continued to meet regularly during the first week; after which time, Dr. Gibson saw her occasionally, during the progress of the case, as convenience or inclination dictated; Dr. Meigs continued in regular attendance some time longer.

"December 26. Mrs. R. has continued perfectly well; soon after date of last report, was permitted to leave her bed; the slough on the back soon separated, and caused but little inconvenience; the incision in the abdomen has healed, with the exception of a small fistulous opening, which is occasionally touched with lunar caustic; her diet has for some time past been generous.

"February 21, 1838. The fistulous opening heretofore noticed continued a source of annoyance till the 10th inst., since which time it has been entirely closed; the cicatrix is now complete, and looks healthy.

"*Remarks.*—Our patient had a better 'getting up' than many females after an ordinary accouchement; her sufferings after the operation were slight indeed; in twenty days from the day of its performance, she sat up; and for some days previous, constantly nursed her infant. The adhesions connecting the uterus and abdominal parietes in front were so extensive, as almost to have permitted the performance of the operation, without necessarily opening the peritoneal sac; very much diminishing its dangers. It may be worthy of notice that, nine months subsequent to the former operation, during lactation, the menstrual discharge returned, healthy and natural in every respect. During the progress of the case, the patient was visited by many of our medical friends.

"The infant has grown finely, not having had an hour's sickness since birth."

CHAPTER XVII.

INDUCTION OF PREMATURE LABOR.

In cases of deformed pelvis in which the reduction of the diameters has not gone too far, the child may be rescued, if it be delivered at a period between the attainment of its viability and the completion of term, if the development of it shall not have rendered it too large to pass through the contracted passages.

The fœtus in utero is understood to be viable or *livable* at the completion of the seventh month; at that period the fœtal characters of the heart have begun to approach towards those of the respiring child, and the pulmonary vesicles have become so thoroughly developed, that most of the children born at that term are free from the danger of atelectasis pulmonum. For a woman with a bad pelvis—with a pelvis reduced, for instance, to three inches in its diameter—it is very good fortune to be prematurely delivered, if the uterine gestation have not gone beyond the eighth month; for the head of the child at that time is both small and very ductile. The observation of cases in which women with deformed pelves have given premature birth to living children, led at length to the adoption of operations, by means of which the child is ushered into the light, at times supposed to be so happily chosen, that the disproportion between the fœtal head and the contracted pelvis should not render its escape impossible.

Dr. Denman, in the tenth section of his twelfth chapter, treats of the propriety of bringing on premature labor, and the advantage to be derived from it. The first information which he obtained upon the subject was derived from Dr. C. Kelly, who informed him that, about the year 1750, there was a consultation of the most eminent medical men at that time in London, to consider of the moral rectitude and the advantage to be expected from the practice; which, it appears, met the general approbation. The first case in which it was necessary and proper was terminated successfully by Dr. Macauley. Dr. Macauley afterwards performed it several times, and sometimes with success, and

Dr. Denman relates the case of a lady of rank whom he attended with Dr. Savage, in consultation, in which the operation proved successful.

Dr. Lee, in his *Clinical Midwifery*, 2d ed. p. 81, relates the history of the operation in the labor of Mrs. Ryan, æt. twenty-one, *primipara*. —She lost the child after an embryotomy operation. In her second labor, Dr. Lee opened the membranes at the eighth month: he perforated the head. The third labor was brought on at seven months and a half; the feet presented; child lost. Fourth labor, induced at seven months; footling; child dead. Fifth labor, induced at the seventh month; the child, born alive, died in sixteen days in convulsions. Seventh labor, induced at seven months and a half; the feet presented; child lost; great force required. Eighth labor, induced at seven months and a half; feet presented; child dead. Ninth labor, induced at the seventh month; the feet presented; child lost. Tenth labor, membranes perforated at the seventh month; child lost. Eleventh labor, induced at the end of the sixth month; child dead. Twelfth labor, induced in the seventh month; child dead. Thirteenth labor; at the end of the sixth month, labor induced; child lost. Fourteenth labor, seventh month; child extracted alive, but soon died. Fifteenth labor, seventh month; child lost. I have cited this case of extraordinary perseverance, on the part of Dr. Lee, as much to show the resolute energy of that gentleman, as to show what may be expected in many of the cases of induction of premature labor.

It is not to be doubted that the operation is legitimate, and that he who does it properly acts within professional rules and usages; but, inasmuch as every premature labor furnishes some just grounds of apprehension, both for the parent and child, I am very clear in the belief that well-understood motives alone can justify the accoucheur who performs it. A woman may lose her child in labor, and so on throughout a succession of labors, from faults not at all relative to the state of the pelvis. A lady was under my care in this city, who, in sixteen pregnancies, had given birth to only one living child; she subsequently gave birth to two children, of which the first was born a little past the eighth month, whereas the gestation of the last son continued until the close of the ninth month. There was never suspicion of the least fault in the dimensions of the pelvis. A lady of this city, out of eight children, lost seven in labor. It was proposed to her, previous to the birth of her ninth and last child, to submit to the induction of premature labor. I had been long convinced that the cause of the death of the children, in this person, was a cause relative to the action of the uterus, and not to the resistance of the pelvis; for children, the transverse diameter of whose heads amounted to full four inches, had been expelled, or drawn forth with the forceps. I had always maintained that the loss of the children was occasioned by the preternatural energy of the uterine contractions, which, from the beginning to the end of the parturient effort, were of a character deserving truly to be called ergotic; the contractions of the uterus were permanent, and, as the children were large, the placental circulation was always suspended by the pressure of the after-birth against the trunk of the child's body, so that, when born, it was born dead from asphyxia.

The deep interest which I took in the misfortunes of the parents, thus deprived of the comfort and hope of offspring, did not prevent me from resisting the proposition to bring on labor prematurely, and I felt prompted, from a desire I had to explain myself to the gentleman interested, to address to him a letter, of which the following is a copy, and which I publish here with a view to send it forth, not as an argument against the induction in cases suitable for it, but as *a caution* to such as might feel tempted, unnecessarily, to resort to this method of saving the child. I do not suppose I could make a better array of the motives for delaying the operation than I have here done.

The following is the letter which I addressed to the gentleman interested, who, being himself a physician, had assisted at the very large consultation of physicians summoned for the purpose of deciding the question as to the induction of premature labor in the case.

Thursday, *August* 17, 1843.

MY DEAR E.:

As you appeared yesterday to be at a loss to decide upon the steps proper to be taken in the approaching crisis, and as I suppose rather inclined in favor of the operation for the induction of premature labor, I think I shall feel better satisfied if I lay before you in writing the reasons which compel me to entertain an opinion perhaps wholly contrary to your own sentiments and wishes, yet maintained, as I think, for your real interest and happiness. I prefer that you should have this written statement both for your own greater satisfaction and also in order that I may not be at all misunderstood. Opinions thus deliberately expressed and defended are safer than those delivered *vivâ voce*.

I am sure that you already know that I approve of the operation for inducing premature labor, in all cases where it is not performed too early to admit of the viability of the child, and where the withholding of it altogether, involves the *mother* in the certain necessity and risk of a severe embryotomy operation.

If the antero-posterior diameter of the upper strait is below 3½ inches, there is always the greatest probability that embryotomic instruments will be required; I say, the greatest probability; for it is certain that children have been born without their aid in cases of pelvic deformity even greater than this. Such a deformity, then, if it does not go too low, would warrant the operation, and recommend it as an act of professional duty. Now my opinion on this point is, I hope, very clear. But where the pelvis is of such magnitude as to admit of the transit of the fœtal head, and further renders the application of the forceps practicable, I hold that no man would be justified in inducing premature labor, without exigent necessity arising out of some well-understood, highly probable peril of the mother herself.

In the case in question, we have seen delivery effected in a labor of four hours with a fœtal head of dimensions which may, without exaggeration, be termed enormous; for a head of four and a quarter inches in the bi-parietal diameter is equal to the largest head I have ever seen at birth, and is just nine-twentieths of an inch above the average magnitude.

The history of the past labors shows that the difficulty does not depend upon the smallness of the pelvis, either actual or relative. The history of hundreds of labors issuing happily will show that the fœtus can bear longer and severer pressure of its *cranium* than ever has been borne in our case. In fact, the history of these labors, as I know that history, shows that the evil has been in the uterus, and not in the pelvis. This, perhaps, you may not admit.

Peradventure, a premature labor might be marked by a character of uterine action different from those that have fallen at term. But shall a man feel justified to enter on an important operation, one admitted to be dangerous to the mother and uncertain for the child in the proportion of 50 per cent., upon the ground of a mere peradventure? I cannot think so.

I am not much accustomed in my medical transactions to be guided by what are called authorities. In the first place, every case of disease, and every case of surgical disorder or accident, is a speciality. The action upon each case should be determined by judgment held upon the case, and not upon reported cases. Besides, I conceive myself to be capable, after the clinical experience I have had, of judging for myself; of making up my own opinion of what is my duty in every instance of disease submitted for my opinion. Were I, however, very readily inclined to follow the masters, I know not where I should look to find an authority for this operation. The only one that has the least resemblance of favoring it is that of Denman, who twice induced a premature labor successfully for women who had previously lost their fruit in utero in the seventh month. The cases, you see, are not parallel, and, if they were, I should not be moved by them; for I have seen a woman lose four children in successive pregnancies, from the sixth (or fifth) to the seventh month, who yet bore children afterwards at the full term, and in good health. Dr. Denman's patient might have done likewise, and I think he was not justified even by his good fortune in the dangerous operation he performed; I think he acted like a rash and injudicious man, whose success is no palliation of his error.

To force or invite the womb to enter into action before term is to do violence to the organ by a voluntary interference with the law of its organism. It is a rule, universally accepted, that we must not do violence to the womb except upon urgent necessity; I adopt and teach this rule; and I can never feel myself justified in recommending such action, unless I can have very clear perception of the necessity for it, as relative both to the mother and fœtus. So it is pretended that such exigency exists in relation to your lady.

I believe you have taken too flattering a view of the operation, even as it relates to the child itself.

A child is esteemed to be viable at the end of the seventh month. It is, I say, esteemed as viable, yet the facts show that a very large proportion of seven months children fail to live long. Indeed, it is understood that fifty per cent. of the whole sum of human progeny is lost at the end of the sixth year after birth, and how much greater the percentage in the cases of premature parturition.

If you will examine the results of the operation in Dr. Churchill, you will observe that he states in all 945 cases of the induction; I suppose that many of the 945 cases are restatements, *i. e.* they are cases stated over and over again; but, admitting that there have been 945 operations in fact, we still find that only 536 children lived. Lived, I say, but no man knows how long; and it is not uncharitable to say that, if we knew the whole truth, we should be obliged to make a very large subtraction from the number of 536. I have not the least belief that near one-half have been saved! and it is admitted that many of the operations were unnecessary, and even preposterous.

Dr. Chailly tells us that of the 211 cases collected by Stoltz, though more than one-half of the children were living, one in fifteen of the women died. Such a result proclaims the operation to be dangerous. It is true that we cannot here decide as to the difficulties and dangers of these 211 cases, and it may be true that the operation is less dangerous for a woman with an ample pelvis than for her who has a deformed one, and that in our own case the danger would be less on account of the known capacity of the organ. Be it so—but the argument is a *felo de se;* for it goes to show that it is not demanded by Mrs. E., but only by the child.

Has the child claims? Yes! but the claims of the mother are paramount. Is it demanded as referable to the gratification of an anxious desire to have a living offspring? That is a holy and righteous desire. God grant it may be satisfied; but the function of the surgeon and accoucheur appertains to the *health* of the patient; the happiness of the patient is the gift of God. The surgeon cannot lift the veil of the future; and if he could, he would, perhaps, be even more reserved than he is now as to the institution of attempts, whose object goes beyond his true vocation. Let him adhere to his vocation, which is fulfilled when he preserves or restores the health of his clients. The mother is his client in the paramount degree.

Let us essay to set in order some of the reasons for waiting until labor shall begin spontaneously in this case.

1. She has given birth to one living child.
2. She has had one unassisted delivery.
3. She has had children of enormous magnitude.
4. There is great reason to suppose, even if it be not absolutely true (as I believe), that the fault is in the nature of the uterine fibre, and not in the form or dimension of the pelvis. If so, then no operation is admissible.
5. She has recovered well.
6. She has been delivered of a child beyond the average size, in a labor of only four hours.
7. No man knows whether the child now in utero is above the average size.
8. If there is a breech, knee, or shoulder presentation, what should we gain by a violence done both to the mother by the operation, and to the child by hurrying it into the struggle before it is completely developed and prepared for the strife.
9. Who knows if it be or be not a twin pregnancy? if it be a twin pregnancy, what vain, what poignant regrets over a step signally false!!

10. Possibly, she may spontaneously enter on labor at eight months and a half.

11. Do we know that it has not already a prolapsed cord?

12. Suppose the operation done, and the lady attacked with the chill so common in the case—suppose her the victim of a metritis—with a living orphan child? *cui bono!*

But, my dear E., I will not continue to string together objections; they are all comprised in the single fact that she is a fit subject for a forceps operation, if that *should* be demanded by the circumstances. This fact is an unanswerable one, in my estimation. It is true, I could set forth reasons of a moral complexion for refusing intervention, but I shall refrain considering them, as equally obvious to you and to me. I pray you, however, in this matter, not to misapprehend me; I have no doubt of the morality of the induction; nor of our legal right to do it, under the diploma given by the authority of a State. I look upon that diploma as an authority given to me by State commissioners, and, in the name of the State, constituting me judge, to act at my peril under the indications of an upright and enlightened conscience and judgment. But the spirit of my commission is caveat as to all rashness and irregularity of proceeding.

I hope the effect of this letter may be to lead you to submit with readiness to the voice or will of the consultation, which was not given in favor of the induction. We admit we do not know, and no man can know, what the result will be; but I trust you will believe that, should it be fortunate, I shall greatly rejoice in your mutual happiness; if it should be unhappy again, I shall sympathize in your distress. I shall in any event steadily adhere to this, viz.: that it is better to suffer the ills that Providence sends for our chastisement than, by rash and ignorant measures of precaution against them, make them tenfold more intolerable.

I am, &c.,

* * * * * *

The following notes were furnished to me by my friend, who was present at the birth of this ninth child. The history of the labor and the measurements of the fœtus, as well as its weight, serve, I think, fully to confirm my opinions in opposition to the proposed operation in the case.

NINTH ACCOUCHEMENT.

August 29, 1843.—*Eight months and one-quarter (or one-third at most) of utero-gestation.*

Labor commenced about seven P. M., a short time before reaching home after a long ride. Quarter past seven.—Reached home, and went immediately to bed; pains recurring, at intervals of ten or fifteen minutes, until eight o'clock, when they became more frequent and of shorter duration.

8½ P. M.—Dr. Hodge arrived; found os uteri size of half a dollar.

9 P. M.—Vs. ℥xxv; Dr. Meigs arrived during the operation.

20 minutes past nine.—Gave 40 grs. Dover's powder by enema.

45 minutes past nine.—Gave 35 drops laudanum, by mouth.

50 minutes past nine.—Pains recurring; membranes protruding; os uteri fully dilated.

55 minutes past nine.—Pains on and off; intermitting; uterus relaxes after pain, which is unusual in her case.

10 P. M.—Pains every few minutes.

10 minutes past ten.—Cramps in left leg during pain.

20 minutes past ten.—Anodyne effects decided; patient complains of feeling sleepy; pains continuing regular and natural until

5 minutes before eleven—when a strong pain came on, with bearing-down efforts.

11 P. M.—Good pain; head descending rapidly; membranes ruptured.

5 minutes past eleven.—Child born; no accident or artificial interference; weight seven and one-quarter pounds, dressed.—Male.

Head.
Bi-parietal diameter $3\frac{6}{10}$.
Occipito-frontal $4\frac{6}{10}$.
" -mental $5\frac{4}{10}$.
Bi-temporal 3.

CHAPTER XVIII.

INVERSION OF THE WOMB.

INVERSION of the womb is that state in which the uterus becomes turned inside out. Inversion is incomplete or complete. When it is incomplete, the vault or concave of the fundus has fallen down into the cavity of the body, of the neck, or of the vagina, of which it may occupy the upper extremity.

When inversion is complete, the vault of the fundus has come quite out through the os uteri, followed by the corpus and the cervix. The womb, soon after delivery, is too large to remain wholly inside of the pelvis when it has become completely inverted. Therefore, I say that, when the inversion is complete, it comes entirely outside of the genitals. In this case the womb is inside out, as a stocking is, that has been turned inside out in drawing it off the foot.

The accident is a rare one. Yet the consequences of it are so terrible, that the accoucheur ought not in his practice to lose sight of the possibility of its occurrence, nor fail to guard his patient against it.

When the womb remains relaxed or uncontracted after the delivery of the child, no attempt ought to be made to take away the after-birth by pulling at the navel-string. Should the placenta be still adherent to the fundus uteri, any tractions exerted on the cord would tend to draw forth the after-birth, which might, perhaps, drag the fundus uteri along with it, and thus turn the organ inside out, or invert it.

The patient who has just been delivered is sometimes still affected with a tenesmus which provokes her to bear down. This is not safe, since, if the vault or fundus of the womb should happen to be relaxed, the straining of the parts above it might push the vault inwards into the womb—like the bottom of a junk-bottle—and, when once thus partially inverted, such straining would turn it quite inside out. The Student ought to read Article IV. of M. Leroux's work on Uterine Hemorrhages, in order to learn how clearly the eminent Dijon accoucheur has expressed his opinions on this subject, and to become aware of the risks to which patients in labor are exposed, when conducted by those who do not fully understand the subject of inversion of the uterus.

Inversion of the womb is one of the most dangerous accidents that can happen to a lying-in woman; it is always attended with severe pain, and the most violent hemorrhage; and, if not early remedied, becomes soon irremediable, since it would be as easy to turn a non-gravid womb inside out as to restore forcibly an inverted one, when many days or hours have elapsed after the occurrence of the inversion.

Those who have had the hand in utero, in turning, can well appreciate the exceeding laxity of the womb when not affected with the pains; they can readily conceive that the mere weight of the after-birth, still attached to the fundus, might, were the woman standing upon her feet, cause a commencement of inversion, which could become complete by means of the woman's strong voluntary efforts to bear down her pains. It is not to be doubted that instances of inversion have occurred in which the practitioner deserved no further blame than that of not taking the proper precautions against its occurrence, by commanding the patient to preserve the horizontal posture, and abstain from all bearing-down efforts. Levret gave very special directions to keep the patients in labor, in a horizontal posture; and where a woman is supposed liable to hemorrhage connected with too sudden a delivery, he charges us to rupture the ovum early, in order that the expulsion of the child may take place slowly, and thus safely.

Notwithstanding the occurrence might take place spontaneously, and immediately after the birth of the child, yet, in a major part of the examples, it has been produced by an improper haste and impatience to get away the after-birth.

I have seen but three persons who have had inversio uteri, and they are recovered; one, Mrs. S., was already the mother of two children when she again became pregnant of the child born in June, 1831.

It seems that, having, on both the preceding occasions, suffered severely from the method adopted by the physician in removing the after-birth, and supposing that a midwife would deal more gently with her, she engaged an old woman, much accustomed, as it was said, to the care of women in labor, to attend her upon this occasion. The child was born by a very easy labor, but the after-birth not coming away so promptly as it was desirable, tractions were made upon the cord, which caused the after-birth to come into the vagina. This gave the patient exquisite pain. The midwife, who could not understand why the woman should suffer so severely, made haste to draw the placenta forth by the cord, which made her cry out so loud that it was said her voice was heard in the street. When the mass came away, the good woman found it still adhering to something; she could not take it up, and put it into a basin. She therefore continued to pull at it with great force, not knowing that she held in her hands the after-birth still adhering to the fundus of the womb, which was now completely drawn forth and turned inside out. The hemorrhage was enormous, and the patient soon sunk into the extremest weakness and exhaustion. Half an hour elapsed before she thought proper to confess her incompetency to manage the case. I was sent for, after she had acknowledged her ignorance of the method of proceeding, and, when I arrived, the patient was without pulse, very cold, suffering the extremest distress, with constant jactitation, and a thirst that was unappeasable. To all appearance the woman was in the agonies of death. I found the globe of the womb hanging down full half way to the knees, and still invested with the placenta and membranes, except where they had been torn and broken by the attempts of the midwife to pull the entire mass away.

Having endeavored to push the whole womb and placenta back into their natural position, but finding I could not succeed, I sent for my venerable friend Dr. James, who speedily arrived. Dr. James now made an attempt to reposit the womb, but he also failed. By his advice, I removed the placenta, but could not force the uterus up into the pelvis.

In making the attempt to restore it to its place, I followed the method recommended in the books; that is, I compressed the organ in both the hands in order to reduce its size. At last, I observed that the more I handled it, the firmer and harder it became; in short, that I excited in it the after-pains, just as we excite them by frictions on the hypogastrium after the child's birth. I therefore inferred that the proper way of proceeding would be to let it rest, and as soon as the relaxation of the organ should be complete, as it is in the intervals between the ordinary after-pains, to endeavor to indent its fundus, like the bottom of a bottle, and then carry it upwards. I found, upon observing it, that the womb repeatedly expanded or relaxed, and then contracted again, being soft in the former and hard in the latter state. Taking, therefore, the moment of the completest relaxation, I indented the fundus with one finger, and, as it became more and more concave, I applied each of the fingers in succession, until I found that the progress of the fundus inwards was impeded by the os uteri, which, although completely inverted, yet resisted for some time the attempt at reposition. By a resolute perseverance, I finally had the pleasure to overcome the resistance of the os, and the peritoneal surface of the fundus was pushed upwards beyond its os uteri, until at last the womb was found to be completely restored to its natural position, but still containing my hand, which was now up as high as a little above the umbilicus. As no contraction came on immediately, I retained possession of the cavity of the womb, which I gently excited by moving my fingers within it, and finally a contraction came on which I suffered to push my hand out into the vagina. Upon withdrawing the right hand, I felt with the other the womb very firmly contracted in the lower belly, and enjoyed the satisfaction of complete success in this distressing case.

I have said nothing of the brandy and volatile alkali that were given to the woman to keep her from dying. She took a very large quantity of these articles, besides laudanum, before I left her, which I was obliged to do in order to attend to another patient; and I feel under great obligations to my friend Dr. George Fox, who came at my request, and took charge of Mrs. S. for the remainder of the time that she continued ill. Her situation when I gave her up to his care was nearly desperate, from anæmia; nevertheless, by the administration of proper restoratives, and the judicious exhibition of stimulants during several hours, she rallied, and, in no very long time, recovered a good share of health.

From that period she was, for a long time, not quite regular as to the catamenia, which appeared at uncertain periods, and less abundantly than before her dreadful accident.

Since the occurrence of the above-recited events, Mrs. S. has been twice safely delivered of healthy children by my friend Dr. Bache. It is worthy of remark that the placenta was adherent in these cases also; and Dr. B. was not able to effect the delivery of the after-birth, until he had separated it from the womb by the introduction of the hand into its cavity.

I cannot refrain from mentioning here the case related by Mr. Charles White, of Manchester, in which he succeeded in restoring an inverted womb to its natural state by compressing it and then pushing it up. In his case, the inversion could not have been complete, since, although he represents the inverted uterus to have been as large as a child's head, it was never expelled through the external organs, and it is improbable that, if fully inverted, it could be retained in the excavation. Mr. W. regards his method as of the very highest importance, and thinks he should never have succeeded but for the compression of the womb in the hand.

I am ready to admit that it might happen that a tonic contraction of an inverted uterus should come on at once, and last so long as to prevent, for some time, the employment of the plan that I suggest; but I think it probable it would always be practicable to return it, in any case where it had not been inverted more than four or five hours, by waiting for the moment of its greatest relaxation, for such a moment must surely arrive, and then, first indenting the fundus, and afterwards pushing it steadily upwards through the os uteri, carry it at last into the abdomen again.

It has been stated that, when the womb is only half inverted, the woman is liable to greater pain and danger than where it is turned completely inside out, in consequence of the strangulation of the part that is griped by the os and cervix uteri. It is thought by some persons good practice, in such cases, to make the inversion complete. I am unable to speak of this point from any experimental knowledge that I possess, nor do I know that the probabilities of recovery would be greater with a complete than with an incomplete inversion. Inasmuch as the muscular action of the womb is always found to alternate with periods of relaxation, it would probably be in the power of the accoucheur to succeed in curing this partial inversion, by getting his hand within the cervix, and keeping it there until he should find the womb relaxing. As soon as the relaxation should be considerable, he might thrust the inverted vault back to its place, as was done by both Levret and Leroux, according to the relation of the latter named author. Such an attempt, if cautiously and wisely made, could be productive of no harm. If unsuccessful, the woman must be committed to the chances of a spontaneous reposition.

But, if there be any ground to hope for a spontaneous replacement, as I shall hereafter contend, it seems to me that it would be wiser to let the incomplete inversion alone, trusting it to the power of nature, rather than incur the hazard of wholly inverting it, which would greatly lessen the prospect of a future spontaneous cure.

Of course, I am understood as recommending this confidence, or rather hope in nature, only for those in whom every reasonable attempt to restore by the hand has utterly failed and been quite abandoned.

A careful and attentive practitioner of midwifery will never fail, after the delivery of the placenta, to examine by palpation of the hypogaster, the state of the uterine globe; and there can exist but few individuals in whom such an examination would not disclose the absence of that proper degree of convexity of the fundus uteri, should it exist, which is the sure demonstration of the truth that inversion, either incipient or complete, has taken place.

Inversion can only take place by the falling in of the dome of the uterus, and such fall is sure to show the upper part of the organ concave instead of convex, upon palpation of the hypogastric region.

I delivered a woman some time since who was moribund with hemorrhage from placenta prævia; when I turned the child and brought it away by the feet, the womb, which was as flaccid as a wet ox-bladder, sank inwards, allowing the placenta to come forward to the os uteri. I took the placenta away, and the dome of the uterus came into the vagina. I pushed it back; it made no resistance; and when I withdrew my hand, it followed it again. The patient expired in a few minutes.

I considered her to be dying when I reached her bedside.

The utter flaccidity of this uterus has convinced me that the cases reported of spontaneous inversion may be really so, and independently of any rash manœuvres; for the atonicity of the muscular apparatus may be so complete that the rest of the component tissues of the womb can by no means prevent it from becoming inverted under the slightest efforts of breathing, of tenesmus, or even of change of position.

I met with a case in which the womb had been inverted about two years. I am informed that the woman had a very profuse hemorrhage, and was thought to be in extreme danger at the time of her confinement. She gradually got better, however, but remained subject to frequent attacks of hemorrhage, by which her strength became greatly reduced. At length a physician whom she called in made an examination, and found the womb inverted. In this case the womb hung down into the vagina, and was, I think, turned completely inside out; it was not much larger than the healthy non-gravid womb, and did not appear to be very sensible on pressure, but bled very easily. By careful regulation of the diet, strict attention to her bowels, and the use of astringent injections, under the care of her physician, Dr. Mœhring, the hemorrhagic tendencies had of late been happily counteracted, and she was acquiring a more decided state of health. She went freely now about the house, and even about the city. This I regard as a very consolatory case, as it furnishes additional ground to hope for the escape of our patients with life, even where the inversion is incurable.

Without considerably altering the above paragraph, I shall now state that, subsequently to my visits and examinations, this patient was seen and examined by Dr. Hodge, Professor of Midwifery in the University of Pennsylvania. Dr. Hodge has assured me that he had no doubt of the diagnosis, which was inversio uteri. Dr. J. Warrington, a practitioner and lecturer on midwifery, had charge of her afterwards, and made the same diagnosis, of the correctness of which he entertains no doubt. After her health had greatly improved, she manifested symptoms of pregnancy, and proved to be pregnant by miscarrying of a fœtus of near five months. Here, then, was a case of spontaneous replacement of an inverted womb. Of the third case that I met with, the following is the recital.

May 5, 1841. I this day saw Mrs. S., aged twenty-seven, residing in Marshall Street. This lady is the mother of two children, the youngest of which was born five weeks ago. My friend Dr. Levis, who was in attendance, and who invited me to the consultation, informed me that the infant was born some time before he reached the house, so rapid was the parturient process. He found the lady lying on her back near the edge of the bed—the feet resting upon chairs, as if she had scarcely found time to get upon the bed, before the eruption of the child, which a woman was holding in her hands in order to keep it out of the great pool of blood in which she was bathed. The child's head, indeed, was quite born before she got off the pot-de-chambre. Upon seeing how great was the hemorrhage, the Dr. pressed his hand upon the hypogastrium, and finding the womb strongly contracted, he removed the placenta, which he found already in the vagina.

After the delivery, she flooded a good deal, and was very weak; but had in a fortnight recovered considerably. After this, she was seized with flooding of a severe character, since which time she has not been free from bloody discharges, which are at times quite copious.

Two days ago the doctor examined the patient, and found a tumor projecting from the os uteri, which he suspected to depend on an inversion of the organ.

The woman is very feeble, and frequently has fits of hysterical delirium.

Upon making the taxis, and also upon examining by the speculum, the tumor so closely resembled the appearance presented by the common uterine polypus, that it was difficult, considering its size, resistance, color, and surface, not to believe that it must be a polypus of the womb which had existed throughout the pregnancy, a circumstance hardly possible, however, to believe. In order to test the nature of the tumor in such a way as to have no shadow of doubt, I introduced half the right hand into the vagina, so as to enable me to carry two fingers quite far up into the *cul-de-sac* behind the cervix; having done this, I moved the fingers forwards so near to the upper margin of the pubis, that my left hand, laid on the hypogaster, was a very small distance from the fingers of the right. They approached so near to each other as to render me perfectly sure that no womb was interposed betwixt them, and therefore that the tumor below was the womb, and nothing else.

She was informed of the nature of the accident that had befallen her, assured of the utter impossibility of any reposition of the organ, and comforted with the expectation of a gradual diminution of the hemorrhagic tendency, with its final cessation, and recovery of health.

Directions were given as to rest, diet, topicals, &c., and then, after some ten days, she dismissed her medical attendants, to call in homœopathic skill and doses, and, *post hoc, sed non propter hoc*, she gradually got rid of her discharges, as the womb condensed itself more and more, and at last became pretty well recovered.

This lady, upon recovering in some degree her health, went on a journey to the Western States, and came back in good health. Some time after her return to Philadelphia, she was found to be pregnant, and was attended in her accouchement by Dr. Levis, who delivered her of a healthy child.

I have received a letter from Dr. Hatch, of Kent, in the State of Connecticut, which I here present to the reader:—

Dear Sir: I respectfully submit to you the full history of a case, to which, you may recollect, allusion was made while passing a social evening at your house during the session of the American Medical Association at Philadelphia, in May, 1847.

On the 22d of August, 1845, Mrs. H., aged twenty-four years, was delivered of her first child. The labor was easy and natural; the placenta was expelled, without interference, about twenty minutes after; the flow was rather copious, yet not enough to cause any alarming depression of the system. Fourteen or fifteen hours after, she was seized with pains (said her nurse), of unusual severity for after-pains, which continued with great frequency for from two to three hours, when they suddenly ceased, and Dr. Beardsley, an elderly gentleman of the profession living near, was called in, being myself at the moment out of the village, who, on my arrival shortly after, gave the following account: "The patient was very much exhausted, surface cold, pale, and covered with a profuse clammy sweat; constant tendency to faintness, and with a pulse so small and frequent as to render it difficult to count it. I gave diffusible stimulants, and employed, thoroughly, warm stimulating spirituous embrocations to the skin. Slight reaction coming on, I perceived within the vagina a tumor which protruded from the vulva, of a size one-third larger than a goose-egg, having an uneven surface consisting of little eminences at irregular distances from each other, which I judged to be the inverted uterus."

We made an effort to replace the organ. Carrying my hand within the vagina, after inspecting the presenting surface, which I found to be, as I suppose, the womb, the thumb was applied to the fundus, which I was able to carry within the body of the organ at least two inches; when at this point, it met with unconquerable resistance, and produced much uneasiness to our patient. Our efforts at its reduction were suspended, and an opportunity allowed for rest. The fore part of the following day Mrs. H. was comfortable. In the afternoon, she became restless: in part doubtless from retained urine. On being raised up, she experienced increased sensation of pressing down, when it was ascertained that the tumor had again, in part, protruded. Being returned to a recumbent posture, the tumor was pressed from its bearing on the urethra, and the bladder was relieved. A messenger was dispatched to New Haven, a distance of fifty miles, who arrived with Professor Beers, of the medical institution of Yale College, about the commencement of the fifth day of the case.

I continue the story by copying from a letter this day received from Dr. Beers, who, in order to make a connected history of the case, transcribes a portion of a letter I addressed to him, which transcript is given in substance above. Prof. Beers writes as follows: "The foregoing relation of this case was communicated by Dr. Hatch in a letter to me, eight months after its occurring, coming down to the time when my own observation commenced, which was on the fifth day from her accouchement. The tumor was found as above described; its size was that of a healthy, well-contracted uterus, a week after delivery; it manifested the elastic, firm feel of that organ—had feeling, but not highly sensitive. The patient bore continued and forcible pressure with little complaint; the abdomen was soft, not full; the uterus could be felt when firmly pressed up above the pubis, and subsided into the vagina when the pressure was removed. There was no doubt of its being a case of complete inversion of the uterus.

"The comfortable state of the patient—her anxiety, with that of her friends, and her fortitude to bear any operation which was deemed prudent—induced the council, with scarcely any expectation of success, to attempt its restoration by mechanical force, carried as far as it should be found could be borne with safety. For this purpose, two instruments were procured with smooth, turned heads, like that of a common walking cane, the larger about two inches in diameter, and the smaller of half that size. The smaller was most used, as it was found better to retain its place on the tumor; the head of the staff was applied to the centre of the tumor, which was the fundus of the uterus; moderate, continued, and at length firm pressure was made in the direction of the axis of the pelvis. The head of the instrument indented perhaps an inch or more into the tumor, and the whole pressed so high that it might be felt above, or even with the pubis. The inverted fundus and body of the uterus were pressed into its more soft and yielding neck, so that it could be felt as it is in parturition, projecting around the more solid part of the tumor, giving flattering hope of ultimate success. This was continued four or five hours. After its removal, and several hours' rest, it was found that no benefit was derived from the operation, the parts having returned to the same state as before the attempt."

I am enabled to add that Dr. St. John, of New Melford, was of the council in attendance upon Mrs. H.; a gentleman whose accuracy in diagnosis commands of his professional brethren about him very high respect, and who authorizes the statements here offered.

I have introduced the accounts of the gentlemen who saw this interesting case, that, in the mouth of two or three witnesses, its true nature may be established. I follow with its subsequent history, which may be considered to lend an item of some interest in support of the position you maintain, in a recently published work, regarding the possible spontaneous reposition of the inverted uterus.

The convalescence of Mrs. H. was slow, but in four or five weeks she was able to walk across her room, and gained strength steadily thereafter; was soon able to ride out; but when in an erect position, suffered a sense of dragging weight in the pelvic region, and often spoke of the tumor as not having sensibly diminished in size, and was continuing to occupy a low position. Between nine and ten months had passed in this way, since her misfortune, when I was informed that the tumor had then lately so changed its location, "that she knew not what had become of it." In the month of February, 1847, she had a profuse menstrual flow, the first considerable evacuation of the kind she had experienced since in this state; and in March a second eruption still more abundant occurred, from which she was somewhat reduced.

Nothing of the kind recurred, and she passed the following spring and summer seasons in good health. Early in the winter, I think in December last, I was applied to for my opinion as to the question of her pregnancy, and was led to concur with the patient herself in the belief that such was probably her condition. No examination per vaginam was had. On the 23d of May last, at four o'clock P. M., Mrs. H. was attacked with a hard chill, and a spontaneous rupture of the membranes immediately ensued. Slight pains came on and recurred at very short intervals till six o'clock, when she was delivered of a boy, whose weight was nine pounds and six ounces. Very slight pains followed at intervals of from twenty minutes to two hours. There being no considerable hemorrhage, I patiently, but watchfully, waited; while, as a precaution perhaps unnecessary, I introduced the staff spoken of by Prof. B. by the side of the cord, within the uterus, till it rested gently on the fundus; nor till six o'clock next morning did the placenta descend—when it lodged low in the vagina, and was removed. The patient and her child are now well.

Yours, with high regard,
JOHNSON C. HATCH.

KENT, *Connecticut, July* 1, 1848.

I have already announced, in a note to M. Colombat's *Diseases of Females*, and in my *Letters on Woman and her Diseases and Remedies*, p. 240, the opinion that there are instances of inversio uteri in which, by means of some power, the processes of which are at present not known or understood, the womb sometimes reposits itself. The two cases of such occurrence that I related in my "Letters," and the case now given upon the authority of Drs. Hatch, Beardsley, St. John, and Beers, appear to me to be quite sufficient to establish the facts.

It is true that Mr. Crosse, of Norwich in England, in his valuable work, entitled *An Essay, Literary and Practical, on Inversio Uteri*, at p. 177, does not agree with me in the opinion that the first two cases here recited are really cases of spontaneous reposition. "It is easier," says he, "to cast a doubt over the reality of these spontaneous recoveries than to remove the obscurity that pervades the subject generally." Dr. C. also hints that I and my friends may have mistaken a polypus for an inversio uteri. Mr. Crosse's words (note), p. 177, 2d part, are as follows:—

"*First Case.*—The disease dated from her delivery, two years before, and had existed for that length of time, when Dr. Meigs was consulted. He took the greatest pains to discriminate, and remained under the absolute conviction of its being inversion of the womb; several others concurred in the same opinion. Fruitless attempts were made to reduce the part. Four years afterwards she became pregnant. *Second Case.*—Nearly five weeks elapsed after delivery before the patient was examined and the vaginal tumor investigated by the speculum, and also by the hand introduced into the vagina, till two fingers passed within the cervix uteri and reached the limit of the cul-de-sac, enabling the investigator to convince himself that the tumor within the vagina was 'the inverted womb and nothing else.' After a temporary absence, this patient returned, became pregnant, and gave birth to a child. Hence Dr. Meigs concludes that the inverted womb 'may reposit itself in some rare instances.' (*Colombat de l'Isère, Dis. of Women*, translated by C. D. Meigs, pp. 182–4.) The deficient account of the method of diagnosis in the first case is, in some degree, supplied in the second; but there is still an absence of that minute detail of proceedings which, in the present day, is alone calculated to convince the skeptical reader. It may be asked, if we suppose in either case there was polypus, and not uterine inversion, 'What became of the polypus?' Perhaps it may be answered, that it is more easy for a polypus to be separated and thrown off than for chronic inversion of the uterus to reposit itself spontaneously. Whilst the question remains undecided, and further evidence is needed, we have only to take care that the right rule of practice prevails. Velpeau, one of our best authorities on chronic inversion, remarks: 'Des faits de ce genre ne doivent être considérées que comme d'heureuses exceptions; il n'est pas aucun praticien sensé qui oserait compter sur de pareils résultats.' (*Leçons Orales de Clin. Chir.*, ii. 427.)"

It ought not, perhaps, to expose me to a charge of excessive confidence in my own perceptions and judgment, if I should say that in both the cases I took the greatest pains to make the discrimination; that I have treated many cases of uterine polypus; and that I have practised as an accoucheur, and been largely engaged in treating the diseases of females, for many years past. Under such circumstances, and supported by the coinciding opinions of Drs. Moehring, Hodge, and Warrington, I aver that no mistake was made. I am now strongly confirmed in my belief by Dr. Hatch's case, which seems to me to preclude all cavil as to the question.

Mr. Crosse cites Velpeau's words, that "facts of this kind may be perhaps regarded as the happy exceptions to a general rule; but there is no intelligent practitioner who would dare to rely upon such results;" and Mr. C. adds: "If we subtract all errors, and admit only the well-authenticated cases, it may still be remarked that spontaneous replacement is too rare an occurrence to have any influence upon the correct rule of practice, viz., the effectuating by art the reduction of partial inversion of the womb in all its different degrees."

These remarks are just and true. Yet as cases do occur in which, from the lateness of the detection of them, or from other causes, the reduction is found to be impossible, it is a most important and consolatory reflection, that there remains the hope of a spontaneous replacement, while we are guarded against the danger of making a discreditable prognosis. There is certainly very little hope for a woman affected with irreducible inversion of the womb, except this very case of exceptional hope, which I have endeavored to establish, and which, I think, ought not to be gainsaid after the testimony in its favor now given. Moreover, there is very little risk that any person worthy the name of Physician would ever desist from every reasonable attempt at chirurgical reduction, on account of any degree of confidence he might indulge in a possible spontaneous replacement of the inverted womb. So that I am not liable to any charge of advising my reader to desist from all reasonable attempts at repositing the womb, in order that he may indulge the mere hope of a spontaneous repositing of the inverted organ.

I have given a conclusive case from Dr. Hatch, of Connecticut. The Student who will do me the favor to turn to the case at p. 610, will see not only that the woman recovered spontaneously, but that, like the patient of Dr. Moehring in this city, she afterwards had a child, as also happened to Dr. Levis's patient. Mr. Crosse's doubts as to my correctness affect me the less, since I have acquired (July, 1851) a copy of Daillez's paper on inversion, a paper in which the spontaneous reposition is clearly made out in several instances. Baudelocque, a careful person, admitted it, and the case of Boucharlatte (Case 34), p. 107, proves it, as in that instance the womb was suddenly reposited after a fall, although it had remained inverted from 1782, when it occurred, until 1790, when, as before said, it was instantaneously reposited, in consequence of a fall. I adhere, therefore, to my opinions, which are, 1st, that we should try to reposit, and 2d, if we cannot, then we may hope for a spontaneous cure.

CHAPTER XIX.

CHILD-BED FEVER.

MANY women are attacked with a violent and dangerous disorder, usually known in the world as Child-bed fever. All lying-in women are to be considered as liable to be affected with this disease, which is often fatal, even in the sporadic forms, while the alarm created by the announcement of its onset is greatly increased whenever the malady happens to be prevailing as an epidemic. During the epidemic prevalence of child-bed fever, not only are those women who may have been recently delivered regarded as being in a perilous condition, but even those who are pregnant, and not yet advanced to the last stage of their gestation, are looked upon with anxiety, as placed in extremely critical circumstances.

It is not wonderful that this great alarm should be excited among pregnant and parturient women and their friends, for it is well known that child-bed fever destroys more women than all the other diseases and accidents of parturition put together. No physician can long practice the art of Midwifery without discovering that a constant and wise vigilance is necessary to obviate the causes of such attack, and cure the patient who has been unhappily seized with it. There is scarcely any form of dangerous disorder that is more insidious in its approach, or more rapid in its development when once its terrific train is set in motion; a development so rapid that the loss of a few hours, at the commencement, renders all after interposition fruitless and unavailing. Not a few of the victims are known to perish within twelve hours, and some even within six hours after the first manifestation of the symptoms. Hence an accoucheur, in full practice, can never feel entirely at ease with respect to the women recently confined under his care; and happy for his patients, if his vigilance never sleeps; else there might be prepared for them a rapid and fearful destruction, whose first signal being unperceived should baffle all his efforts and skill, too late applied.

If these observations are just, then the Student of Medicine, who reads them, ought to consider himself, in all honest, conscientious views of duty, bound to give to this subject a careful and even anxious attention; for it is a subject by no means fit to be studied without earnestness, nor cursorily. There are connected with it many important principles, that seem of little value as to the matter in general, but which, when considered as relative to the causes, progress, and cure of our disorder, are of the highest importance. There are many good and scientific physiologists in the general, who, nevertheless, do not apply their general physiology to the elucidation of those mysterious appearances that are discovered in the course of a violent and fatal child-bed fever. The Student, therefore, ought not only to be a scientific physiologist, but he should be so practically familiar with the laws of life, and its phenomena, as to be able at once to understand and solve the curious riddles that are presented in child-bed fever, in its various and complicated, or even in its simple forms.

I have said that there are curious riddles, or mysterious phenomena, in the disease now under consideration; and, I suppose, no one will cavil with me for saying so, who shall go over the field of inquiry and observe the scandalous discrepancies and inconsistencies of writers on the subject. Diseases that are clearly understood, and methods that are proved to be salutary and successful, unite all voices in the proposition as to their nature and use; but, in our disorder, the utmost latitude seems to have been given to the imagination, so that a complete distraction of the professional mind appears, in the command of this one to regard it as a fever—of that one, as an inflammation—of another, as synocha or typhus; to bleed—not to dare to bleed—to salivate—to rely on opium—on ipecacuanha, on turpentine—on purgative drugs, on saline draughts; and so of every possible suggestion of treatment, until the Student, confused and baffled at last in his search after some sure foundation to rest upon, gives up the search for truth in despair, and resolves to wait until the conflict arises, and then to do as best he may. Yet all this confusion, disorder, and disagreement exists not in the disease, but only in physicians themselves. The disease is one, the writers and talkers are legion, each one having a thought of his own. Doubtless there is a truth of the matter, and what we want is that very truth; which, if it could be once mastered, would clear our library of this discreditable warfare of opinions upon a subject in medical practice than which there can be not one more interesting to us, whether as scholars merely, or as ministers of health unto many confiding friends.

In my opinion, the Student ought to resolve to make himself familiar with all these disputations; to the end that, at last, he should if possible come to some fixed and clear views of his own; but, in doing so, let him first strip off every prejudice, and present his mind a *rasa tabula* on which to receive the impressions of truth, and nothing else. In studying this subject, let him hear everybody speak, but let him afterwards form his own opinion and acquire his own knowledge. I now advise him, if he hears me speak, to question and criticize every statement of mine, whether of argument or fact, and judge as of himself and for himself concerning their truth and value. Should he believe because Gordon believed, or act because Hulme thus acted, he would become Gordon's tool or Hulme's valet and slave. He would not be a scholar indeed, but only a pupil, and a very stupid pupil too; as seeing with his master's eyes, hearing with his master's ears, and aping instead of acting the part of the physician—who, if he be a true philosopher, is in that like a God. While I thus advise and even implore the Student to render himself master of this important topic, I don't forget that I also have very grave duties to perform as a writer on medicine. I am even not without some melancholy feelings of doubt and apprehension, lest, in the weighty matters of this discussion, I should unconsciously add to, rather than lessen the confusion and disorder that I have already complained of. I ought earnestly to wish that I may mislead no young man by persuading him in a false way of pathology or therapeutics as to this fatal child-bed fever, nor set forth any opinions, or inculcate any method, which, being adopted or pursued after my recommendation, should lead to disastrous results. I shall therefore honestly strive to liberate myself from the bonds of prejudice, and endeavor to take such a calm and earnest view of the case as may satisfy both my judgment and my conscience, and leave me without any self-reproach for wickedly joining a faction, instead of honestly adhering to the truth and the right. This I shall endeavor to do; for I know that writers, even those who are as humble as I am, can not print and make public their thoughts, and then recall or cancel what may be amiss or pernicious; and that a word spoken does not cease to live, but passes onwards and downwards like the generations of mankind, doing its good or its evil work by a traditional force, that appertains to all the words and work of men, whether wise or foolish, good or bad.

Having in a former edition of this work, and in other writings of mine, set forth the views with which my mind was early imbued by the precepts and the experience that fell in my way, and having observed my notions of the nature, signs, and treatment of our disorder to be criticized in many respectable Journals, I might be supposed more willing than ever to solicit the favorable opinions of that class of the brethren who are occupied as Reviewers. I cannot, however, regard a medical Reviewer as other than a medical Doctor; and since, as I have already stated, I find a really scandalous confusion in Medicine as to child-bed fever, I can only look upon a Reviewer as *one* among the Doctors, and one who has no greater claim to compel my opinions on child-bed fever than any other doctor of equal attainments. John Fernel, Felix Plater, or good old Monsieur Puzos, or Hippocrates himself, though long since dead, are still members of the ever-living Republic of Medical Letters, and equal in my eyes to the moderns, as still my brethren, and members of my calling. If I cannot change my opinions because those who died 300 or 2400 years ago thought differently, neither can I do so because cotemporary writers take views of the subject different from those to which, after many years of anxious study and reflection, I have arrived. It is now but a few years since most of the continental physicians had not the least hesitation to believe that all these child-bed fevers are the results of the material substance of milk, displaced from its true normal place in the mammary glands, and deposited, by a metastatic action, upon the womb and other parts affected in child-bed fever; so that all obstructions, deposits, and swellings were considered to be what the writers denominated *dépôts laiteux*, or milk-deposits, otherwise called *lait repandu*, or milk dispersed throughout the body or the limbs. Vigarous of Montpellier, an excellent writer, in maintaining, at p. 388, tom. ii., that a metastatic congestion of lymph and milk is the material cause of the disease, convinces himself of the truth of the proposition by *believing* that the purulent and other deposits found within the belly after death cannot be merely the product of the inflammation, because there is no "direct ratio of the product to the inflammation."

Puzos, who viewed the subject in the same light, cannot persuade me that the inflammatory effusions within the peritoneum are caused by metastasis of milk, notwithstanding he, under the falsest views of the pathogeny, was one of the best practitioners that ever exercised his art in the cure of them. He was *par excellence* a bleeder *coup sur coup*, as he calls it. Puzos, who died in 1753, still lives in his admirable writings. But though a teacher in our calling, I feel under no obligation to think and to say yes, or no, because Puzos said yes or no. There be many authors, now dead, who command more of my respect and reverence than many that be now living; wherefore, I hold myself not bound by the orders of any one writer, or any school of writers. In the Republic of Letters, the majority cannot govern.

After the foregoing observations, I shall proceed to execute my purpose of showing to the Student my own thoughts as to child-bed fever;

and I must, in the very beginning, express the regret I feel, to be obliged to use the denomination so commonly adopted for it.

The word child-bed fever is a false and misleading word.

Words are signs of ideas; and many ideas are fashioned upon words. When words truly represent our ideas, they are faithful servants of the understanding, whose state and will they represent and obey; but when our ideas are fashioned or moulded upon words, those words often make false representations of facts to the understanding; and then, instead of being our faithful servants and ministers, they are traitors to us, and deceivers. Now the term child-bed fever is one of these deceiving words; since it infuses into our understanding the false notion that our disease is a fever, whereas in truth it is not pyrexia, or fever, but a pure non-specific phlegmasia. Were it indeed one of the cardinal fevers of Stoll, whether inflammatory, pituitous, or bilious, it would be impossible to take such views of it as we must entertain, provided we regard it as a pure phlegmasia, whose pyrexial manifestations are the loyal and just expression of the degree and stage of the essential phlegmasia, and nothing more and nothing less.

It is therefore, I repeat, unfortunate for science that the word child-bed fever has been introduced among us; and I should at once proscribe it, if I could suppose myself of sufficient authority to enforce such proscription, which I am far from supposing. All that I can do is, to warn the Student to weigh well the meaning or value of the word, and at least in the beginning, to endeavor to liberate himself from the rising prejudice that the disorder is a fever because it is called child-bed fever.

The disorder here to be treated of is observed only in pregnant and lying-in women; yet it is not one, but many.

It is inflammation of the womb alone; or it is inflammation of the veins of the womb; or it is inflammation of the peritoneum; or it is metro-phlebitis, or metro-peritonitis; or else a combination of metro-peritonitis with phlebitis. These are the several forms of the disease.

In making the above enumeration of the several forms of our disorder, I have purposely omitted the cases of ovaritis and other topical lesions, such as inflammations of the Fallopian tubes. I am convinced that we shall have a sufficiently clear view of the matter if we comprise all the puerperal cases in the single group, composed of metritis, metro-phlebitis, and peritonitis.

For a great many years past, the medical press has teemed with papers containing accounts of the signs left by our disease, and discoverable in the remains of those unhappy women whom it destroyed.

It is everywhere conceded that these signs or appearances are to be considered as evidence of a foregone state of inflammation, during the fatal illness of the subject; and even Puzos and Vigarous, as well as their cotemporaries, could not but see these signs, notwithstanding they were blinded by the prejudice of the general notion of metastasized milk or other fluids. Many hundreds, probably many thousands of bodies, examined after death, have shown the womb covered with inflammatory exudation, and bathed with serum or sero-pus; or reduced to a state of ramollescence by the late inflammation. Similar appearances are seen as to the ovaries and tubes.

Multitudes of the victims disclose, upon dissection, no outward signs of disease of the uterus; but, upon laying it open with the bistoury, the whole uterus or part of the inner wall is found totally softened and ulcerated, or gangrened. Again—the womb-substance may at the first aspect appear to be perfectly normal in volume, hue, and consistence; but, upon incising its texture, many of its veins and sinuses are observed to be distended with pus, which has been formed by the very vessels within which it is detected by the dissector. In other cases, the above appearances are discovered as to the uterus and its veins, and along with them traces of inflammation, with which the peritoneum, in whole or in part, had been affected during the several phases of the disease that caused the extinction of the woman's life.

Some of the subjects clearly show that the patient had suffered under an unmixed, uncomplicated inflammation of the peritoneum, which, though of such violence or extent as to end in death, did not at all involve the womb-substance, nor the veins of the womb.

In contemplating these three cardinal forms of child-bed fever, I mean metritis, metro-phlebitis, and peritonitis, I say that the Student ought to conceive of them as having a primary seat either within the uterine veins, in the uterine substance, or on the intra-pelvic peritoneum.

Though the post-mortem traces of peritonitis are sometimes observed to have pervaded every part of that serous membrane, still it is reasonable to believe that the primary or incipient area or areas of the inflammation were directly connected with the womb, as constituting its serous lining, or with the ovaries, or tubes, or round or broad ligaments, or vagina. Indeed, it is very little probable that the primary areas of the phlogosed serous membrane ever exist beyond the pelvis; and, if this opinion is well founded, it is a most important one, since the indication is based upon it, that, provided the original area of inflammation is really located within the pelvis, we ought to be not only prompt, but efficient in our design and duty to limit it within that region, and constrain it at least not to advance beyond its present bounds; impressing upon it, by means of our remedies, a tendency to recover by *resolution*. I have met with many cases of child-bed fever, in their very early and forming stages, and I have always sought for and detected the signs within the pelvic region. When I have unhappily been called so late as to find the peritonitis had extended its area beyond and quite far above the plane of the superior strait, I have always had the most painful misgivings as to the impending crisis for the unhappy woman. A woman might well withstand a peritonitis, or even metro-peritonitis, in which the peritoneal elements of it should not migrate beyond the plane of the superior strait, whereas she should inevitably succumb under such an expansion of the area of phlogosis as might comprise within it the whole peritoneum, and, of consequence, all that it invests and can affect by its states of health or disease. No person will be bold enough, however, to deny that such a violent inflammation of the womb as might suffice to decompose and convert its substance into a soft, semi-pultaceous mass, must prove fatal to the patient; and I have seen a uterus that became completely softened by an inflammation of only two days' duration. Tonnelé has given abundant proofs that the cases may be as just stated. Yet it will be found that a majority of the fatal results arise from an extension of the areas of inflammation quite up into the belly, all whose viscera are to become involved in the destruction, inasmuch as their serous covering is a part and parcel of each one of them. It is this extension of the area that is to be chiefly deprecated and opposed by all the means of art.

If, as I above said, the woman shall perish because the uterus is ruined by the inflammation, how much more surely must she be destroyed, if that inflammation wrap, like a consuming fire, every abdominal viscus in the blaze.

I cannot make an accurate computation of the number of superficial feet contained in the whole peritoneum, including all its duplicatures, but it probably might amount to some sixteen feet, all told. Let the Student imagine sixteen feet of such serous membrane in a state of inflammation, and then ponder for a moment upon the condition of the nervous mass of the woman. Under such distracting provocations, how could he suppose that anything like a steady and regular process of general or special innervations could be maintained within the animal economy? And how can he doubt that all the organs, with their functions, shall speedily fall into inextricable confusion and weakness, seeing that the dominant, conservative, directing powers of the nervous mass are deprived, distracted, baffled, and prevented, by the conflicting impressions and perceptions that attend upon such vast disorders?

But the Student ought to know that what I just now said is not only true, but most important, viz., that the serous coat of an organ is part and parcel with the organ. Hence, when the intestine, stomach, liver, spleen, &c., are, as to their serous portion, inflamed, there is an inflammation of the bowels; a gastritis, a hepatitis, a splenitis, &c., superadded to the metritis or the metro-phlebitis. This ought not to be denied; and if not, then where is the ground for that astonishment that is often expressed upon seeing the sinking state of the woman? A sinking state that comes on early in the case.

This very tendency to *sink* appears to me one of the strongest arguments that can be brought forward, by those who contend that we have no typhus or true adynamic disorder to deal with, but only a vast and deadly inflammation to combat. In typhus, the patient sinks, not because the organs have given way primarily, but because the cause of typhus produces such a state of the nervous mass that it gives way primarily, and the organs secondarily. Typhus depends not upon acute meningitis, nor any inflammatory or catarrhal accident, but it is a primary degeneration or altered crasis of the molecules of the nervous mass, caused by epidemical or contagious poisons. In our sinking child-bed phlegmasias, on the contrary, the outburst is with the organs, to the subsequent overthrow of the nervous mass; the cases are at opposite poles. The nervous centres are the positive, the organs are the negative poles of the functions or powers of animals. Typhus rules at the positive, phlegmasia at the negative poles. As to any embarrassment in accounting for the weakness or sinking in the terrible forms of child-bed fever, I cannot conceive of it, after the presentation of the foregoing statement and contrast. Indeed, the daily observed cases of sinking, or nervous shock, that follow dreadful railroad accidents, wherein limbs are torn or crushed, may well convince any man that the nervous mass, at once and directly, succumbs, and fails under such shock; but it might quite as readily be supposed to fail under the perception of those multiplied and innumerable morbid impressions that are produced by many superficial feet of peritonitis investing important organs, that are dying because their peritoneal portion is at the same time dying.

I have perhaps already said as much as is necessary to show forth my opinions of the nature or pathology of the disorder, as a mere general statement of it. I have not as yet spoken at large of the purulent infection of the blood, or pyæmia, that arises under certain stages of metro-phlebitis, in which pus corpuscles are evolved in myriads from the inflamed endangium. I shall leave these last matters to be treated of in a future page, and shall now proceed to speak of the causes of child-bed fever, reserving to myself the privilege of entering into fuller explanations of the pathological states or pathogenic process of our disorder.

A woman advanced towards the full period of utero-gestation, or one who has recently passed through the conflict of labor, ought to be considered, *ipso facto*, as in a state of precarious health, and particularly liable to be attacked with inflammation. The tissues most likely to suffer such attacks are those that have been directly concerned in the acts of gestation and parturition. In the course of a labor, there is always to be supposed such an amount of distension, pressure, distortion of parts, and check of the circulation and innervation, as to leave no room for surprise when inflammation ensues. Indeed, we have more occasion to be surprised at the failure than at the occurrence of phlegmasiæ as sequelæ of labor.

In addition to the circumstances just enumerated, it ought not to be overlooked that the uterus, and the whole reproductive apparatus, indeed, are undergoing a rapid transition stage of existence—one in which they are to seek a state of organic rest or repose, which is only to be attained at the moment when they shall all have recovered their normal condition, as it exists in the non-gravid state of the woman. This very transition state of the organs is one prompt to morbid deviation in its course, and inciting to attacks of phlegmasia.

Again: the blood of the woman during pregnancy is, for most women, highly charged with the fibrinous elements; a state of the blood that is supposed to give a proneness to inflammatory seizure.

There is, in women recently confined, a marked diminution of the pressure which previously had acted upon all the parts contained within the abdomen. Such diminution of organic pressure acts in a way, somewhat like the lessening of atmospheric pressure upon a part, as in cupping, to allow the unsupported vessels to become over full. If a new-delivered woman should have the abdomen left without due support from the tonicity or muscular activity of the abdominal muscles, fasciæ, and skin, the circulation within could not but become more abundant; since the vessels of the mesentery and peritoneum must be fuller in relaxed than in well-condensed states of the abdominal integuments. Hence I say that relaxation of them, after labor, incites to inflammatory engorgement.

Besides the above-mentioned incitements and provocations to inflammation, there often happen contusions, wounds, and abrasions, greater or less, of parts concerned in the labor; and inasmuch as many orifices of vessels connected with the venous system of the uterus remain patulous long after the discharge of the secundines; and, further, as these orifices are bathed with corrupt and even putrid juices, remaining in the womb, we are rather surprised to find the woman recover without accident, than to see her fall a victim to inflammation of the parts.

The placental disk of the womb, or that part of it which, during the pregnancy, was occupied by the after-birth, is left, by its separation, in a quasi-traumatic state; so that, instead of readily recovering or healing, it may as readily, under peculiar circumstances, pass into a dangerous state of inflammation.

While enumerating the above states as likely to incite to the attack, I am not forgetful of other so-called causes of child-bed fever, nor, among them, the Epidemic cause. There is scarcely any disorder that is more frequently observed to become epidemical than this; and it is a singular thing that it may become so for a single house, used as a lying-in hospital. Or, it may become epidemic in a town only, or in a certain district, state, or nation, or continent. If this be true, then there is to be sought for, and, if possible, discovered, some cause that can either exist as to a single house or even ward of a lying-in hospital, or as to a town, city, or whole country.

The medical writers who have furnished to the profession learned disquisitions on epidemic causation, have signally failed to point out to us what that cause is. And we are to this day as much in the dark on the subject as were the ancients at the date of Hippocrates' treatises on epidemical disorders.

Dr. Sydenham candidly acknowledges our ignorance of the material essence or epidemic cause of such diseases. And while he makes us to know, of a truth, that there are what he signalizes as epidemic constitutions of the air, he by no means presumes to show further than the fact that one epidemic constitution is accompanied with a general prevalence of sthenic disorders, while another one is marked by its train of adynamic affections; and, further, that epidemic causes act to produce frequent attacks of one set of anatomic tissues, to the exclusion of other sets. Wholly unable to find, in the meteorological states of the air, a clear rationale of these influences, he fell back upon the only remaining resource of the judgment, and showed how probable it is that telluric poisons, coming up from below the geological strata, may render the air unwholesome and inquinate.

My own opinion has long been, that many true epidemial diseases do depend upon causes that are produced beneath the earth's crust; and that the volatile, and perhaps imponderable essences in which they consist, may forever escape the extortions of the chemist, or the observations of the eudiometrist. The atmospheric ocean, at the bottom of which we live, to use the figure of Humboldt, cannot but have perpetual relations with the earth's more central and igneous mass. There may then be, and there are probably, many material essences, or compounds, whose names are not yet, and perhaps never shall be, placed upon the catalogue of simple substances. Such elements might inquinate the whole air of a place or a nation for months in succession, modifying the life-force of man in epidemic fevers, inflammation, &c., or they might even be supposed to rise like the material cause of cholera, in certain parallels and meridians, and even to make the circuit of the earth; as cholera has twice done, and as influenza has several times been known to do.

I believe it is correct to say that the meteorological documents have hitherto cast no real light upon the nature of epidemic causes; for those prevalent and wide-spread diseases that depend upon meteorological states are rather to be regarded as weatherly or climatic, than as true epidemial disorders. Hence, it appears to me that the word epidemic-disease, and the word epidemic-constitution, are declaratory and not explanatory words, and mean, indeed, little more than this, namely, that a disease is unusually prevalent, and that such unusual prevalence has some relation to a state of the atmosphere, of the precise nature of which all men are equally ignorant.

Now, although the Student may thus be unable to learn what it is that inquinates the air, and makes us sick, he needs not to deny that the air is vitiated; for he cannot refuse to admit that the cause really exists, and must exist in the atmosphere, and not in the earth, or only in vegetable or animal substances upon the earth; inasmuch as, if they were confined within the bowels of the earth, or unextricated from vegetable substances, or combined in the waters, they would prove innocuous. He can no more escape from the conviction of its existence than he can escape from the conviction that there is time, space, or force; of which, however, he can no more know what they are, than what epidemic cause is. Inasmuch as he can reason upon time, space, and force, and make accurate computations of them, though he knows them not; so can he, in like manner, reason upon epidemic cause, and compute its date, duration, and violence, by its effects and results.

For example, let the Student inquire what it is within the animal economy that can be acted upon by such epidemic causes. In the

Hôtel-Dieu, at Paris, there have prevailed the most devastating epidemics of child-bed fever; that, after disappearing for years, have recommenced their ravages in the same establishment, again and again. The same is true of the Maison d'Accouchements or Maternity Hospital, of the Dublin Lying-in Hospital, of hospitals at Vienna, London, Berlin, Prague, Philadelphia, and, indeed, wherever there may have been established any large houses for the accommodation of numerous lying-in women. Such epidemic-cause has been in activity since the age of Hippocrates, twenty-three centuries ago. I made out from that elegant work of Dr. Meissner, *Die Frauenzimmerkrankheiten*, and from Ozanam's *Histoire Médicale Générale et Particulière des Maladies Epidémiques, Contagieuses, et Epizootiques*, a catalogue of dates and places in which epidemic child-bed fever has prevailed from 1652 to 1845, with references to the authors who have mentioned or described them. I could easily have augmented this catalogue by additions from Churchill's account in the vol. of *Essays on Puerperal Fever*, republished by the Sydenham Society, were it not inconsistent with the objects and limits of this volume to do so. I shall, therefore, subjoin only the data found in Meissner and Ozanam, notifying that the authorities from Meissner are indicated by the letter M., and in Ozanam by the letter O.

TABLE OF YEARS AND PLACES OF EPIDEMIC CHILD-BED FEVER, WITH NAMES OF AUTHORITIES.

A. D.			
1652.	Leipsic,	Welsch,	O.
1672.	Copenhagen,	Th. Bartholin,	O.
1723.	Frankfort and Leipsic,	F. Hoffmann,	O.
1746.	Paris,	De Jussieu and Col de Villars,	O.
1746.	London,	Moore, J. Clarke,	M.
1764.	Dublin,	J. Clarke,	M.
1765.	London and Derbyshire,	Moore, Butler,	M.
1767.	Normandy,	Lepecq de la Cloture,	O.
1769.	London,	Leake,	O.
1770.	Vienna,	Fauken,	O.
1774.	Paris,	Doulcet,	O.
1774.	Dublin,	Collins,	M.
1774.	London,	Moore,	M.
1776.	Vienna,	Stoll and Finke,	O.
1786.	Lombardy,	Cerri,	O.
1787.	Dublin,	Collins,	M.
1787.	London,	J. Clarke,	M.
1788.	Dublin,	Collins,	M.
1792.	Copenhagen,	Rink,	M.

A. D.			
1805.	Dublin,	Collins,	M.
1809.	Leeds,	Hey,	M.
1810.	Dublin,	Collins,	M.
1811.	Heidelberg,	Nægèle,	M.
1811.	Dublin,	Collins,	M.
1811.	Somersetshire,	Bradley,	M.
1812.	Dublin,	Collins,	M.
1813.	Durham and Northumberland,	Armstrong,	M.
1814.	Northumberland, Penn.,	S. Jackson,	M.
1815.	Munich,	F. Boyer,	M.
1818.	Wurtzburg,	Schloss,	M.
1818.	Northumberland, Penn.,	S. Jackson,	M.
1818.	Vienna, Dresden, Bamberg,	Kiwisch,	M.
1818.	Dublin,	Collins,	M.
1819.	Berlin,	Pfeuffer,	M.
1819.	Dublin,	Collins,	M.
1820.	Dublin,	Collins,	M.
1821.	Edinburgh,	Campbell and Mackintosh,	M.
1823.	Dublin,	Collins,	M.
1823.	Vienna,	Lippich,	M.
1825.	Hanover,	Dommes,	M.
1826.	Dublin,	Collins,	M.
1826.	Berlin,	Neumann,	M.
1827.	Barmen and Neuenhaus,	Sonderland,	M.
1828.	Dublin,	Collins,	M.
1829.	Paris, Dublin,	Tonnellé, Collins,	M.
1830.	Giessen,	Ritgen,	M.
1833.	Prague,	Quadrat,	M.
1834.	Paris,	Bouchat,	M.
1836 to 1843.	Vienna,	Klein,	M.
1838.	Stockholm, Paris,	Elliott, Voillemer,	M.
1839.	Wangen,	Zeugerle,	M.
1843.	Paris,	Bidault and Arnaut,	M.
1845.	Dublin,	McClintock,	M.

The foregoing catalogue might with ease be greatly amplified, were time and space allowed me here; but, even as it is, it may serve to show the Student that the *cause*, for there is a cause, may be in activity in many different and distant quarters, and in many consecutive years. At least, the inspection of the table ought to convince him that child-bed fever is no rarely-occurring disorder, and, in fact, is well worthy of his earnest contemplation.

The most singular known property of the cause of child-bed fever is, that it operates upon women pregnant or lying-in, and upon them only; and that, while its reign causes terror and desolation among that class of persons, it never in the least degree influences the health or threatens the security of the virgin, the child, the boy, the man, or the married but non-pregnant woman. The Student may well feel amazed at such a proposition, seeing that pregnant and lying-in women are, as to their generical nature, susceptibility, and forces, like all other women, and in a general sense participate in the nature of man. Hence the Student ought to persevere in the inquiry as to what it is within the animal economy of the gravid woman, that can be acted upon by the epidemic-cause to pervert it first, and then develop the phenomena of the child-bed fever. And here, it seems to me, he may begin to perceive some ground to stand upon. What is it, then, within the animal economy of the pregnant or lying-in woman, that can be acted upon deleteriously by the poisoning force of the epidemic-cause, whereas all other members of the human race are not obnoxious to the power of that cause?

For my own part, I confess that when I contemplate the living being man, I am compelled to attribute to his nervous element, or nervous substance or mass, all his impressionable quality, as well as all his perceptive and motor force, not motion; for I can not but consider that he lives by his nervous mass, and through it alone; and that, whatever within him participates in the condition of vitality, does so because, and solely because it participates in the nervous substance, nervous element, or mass; and that nothing within him lives, save because of its nervous element. If the blood-disk lives, if the macula germinativa is alive, if an ovarian ovule lives, if the nucleus of a cell is endowed with plastic and alterative forces, it is, in all these cases, because the disk, the macula, or the nucleus is endowed with nervous mass, in the condition of, at least, what Oken calls point-substance. And now, having made this averment, it seems unnecessary to say that I consider the derm, muscle, mucous and serous tissue, the vascular, absorbent, and indeed all the tissues, whether of a general or a special anatomy, to be endowed with life-force, only in virtue of the nervous mass within them, without whose presence and combination in them no vital organization could possibly exist.

This is the ground upon which, I say, the Student can begin to stand, and on which he shall be sure at last to find a firm and solid footing.

Seeing that neither meteorology, nor chemistry, nor eudiometry can ever furnish him with any rationale of epidemic-causation, let him, for the sake of the argument, admit, even if but for a moment, that the atmosphere may be rendered unwholesome or inquinate by telluric poisons mixed with its lower strata; then it is easy to conceive that these poisons may, like opium and the narcotics; like arsenic and mercury; like diffusible stimulants, as ether, chloroform, and other such, imperceptibly modify the crasis and healthy force of the nervous mass, to that degree as to extend the ravages of black death, of English sweat, Syrian plague, or Asiatic cholera, or influenza, among thousands or millions of our race; or prevail, as epizootic causes, over the existence of flocks and herds, and beasts of the field, or of fish in rivers and in the ocean. It is easy also for the mind to discover that such an epidemic-cause, though it bring within its range men and boys, unmarried women and children, as well as pregnant and lying-in women, shall not be able to effect such considerable morbid changes in the nervous mass as to make any of these classes become victims to it, save pregnant and lying-in women alone; and these, only because their peculiar condition serves, as exciting cause, to bring out into full manifestation the power of the true proximate cause, or epidemic-cause. Epidemic-causes or poisons, such as this, must necessarily be esteemed to be very weak as to their influence on human health; else, we should certainly observe some changes in the health of other persons besides the pregnant and lying-in. Still, even such feeble poisons may be strong enough to give to the body a tendency or disposition to become diseased—and with such tendencies once established, it is necessary to look no farther than to pregnancy and labor for the exciting and cognizable causes of the malady.

A very curious remark is to be found in Dr. Collins, p. 386, which shows that the modifications of the air which precede the eruption of epidemic child-bed fever in hospitals are gradual. "Dr. Joseph Clarke states it was generally observed that, previous to puerperal fever becoming epidemic in the hospital, the patients recovered more slowly; or, to use the language of the nurses, it was much more difficult to get them out of bed than usual. This, from experience, I have no doubt is the case; and, when observed, should arouse the medical attendant to adopt, without delay, every means he considers in the least calculated to prevent its occurrence."

I am quite sure that all those practitioners who have lived during the prevalence of the epidemic, even without meeting with the cases in their own *clientèle*, must have made the same observation as to the slowness and difficulty of recovery in the majority of lying-in women during the reign of the epidemic.

For my part, I cannot doubt that, during the reign of epidemic cholera in Philadelphia, when we lost some seven hundred or one thousand citizens out of 420,000 souls, there were more than 100,000 persons within range of the cause; whereas, in fact, not many thousands of them felt or perceived anything amiss in regard to their health. Only they, in whom some occasional cause came to start the train of morbid symptoms, could give evidence of the power of the *causation*.

In like manner, I conceive that, in a fatal epidemic child-bed fever, in Hôtel Dieu or Dublin Hospital, the cause could not but embrace within its epidemic-sphere all the nurses and attendants in the house; but, wanting the occasional causes, none sickened save the pregnant and lying-in inmates of the houses, the districts, or states, comprised in the catalogue. I conceive that these remarks are just, and that they sufficiently show how it may happen that an epidemical constitution of the air may incline many women in child-bed to fall sick with peritonitis, or metritis, or phlebitis, although the *cause* is of such feeble power as to be wholly incapable of making any persons except these very women fall sick.

Having now set forth my thought as to epidemic-cause, though not in such detail and with the fuller elucidations that are forbidden by the limits of this volume, I shall call the Student's attention to another supposed cause of child-bed fever, to wit, the so-called contagious-cause.

Many medical men, and along with them a major part of the unthinking, unreasoning public, looking in vain for rationales of the cause of child-bed fever, endeavor to satisfy their hankering after knowledge upon that point, by adopting the notion that the cause of *epidemic* child-bed fever is a contagion.

The Student will naturally be desirous to learn, if child-bed fever be really a contagious disease, what the principle of that contagion is; and I apprehend that here, as in the instance of the epidemic malady, he shall have to rest content with the *sound* of the word contagion, a word which, being interpreted, means communicable from person to person, or by individual to individual. This is the whole meaning of the word; for, as to the how, and the what, no man hath yet obtained any definite notion, since no man hath known or can know what a miasm or a contagion is. Miasm and contagion are words, nothing more; they represent no precise material idea of the mind.

This notion of a contagion of child-bed fever, communicated from individual to individual, either immediately or mediately through a third person, has arisen upon the observation of what are asserted to be facts. It has often happened, for example, that a woman in a lying-in ward, dying with the disease, has been speedily followed to the grave by other women occupying the same apartment; and it has at once been assumed that the second and third victims had taken the con-

tagion from the first victim, and that, withou
pened that the first patient acquired the disord
bable that others should take it in the same w
is observed to meet with many cases in his
brethren in the same town or district meet wit
a monthly nurse, going from one sick woman
speedily falls sick with a like disorder, gives ri
she or that the physician should be looked to
poison or contagion. Such occurrences are n
medical men; so that a physician or a nurse,
been called a walking pestilence.

Deeply impressed as I am with the importa
quite aware that argument and proof are oft
change the fixed opinions of men, I cannot, h
the reasons that compel me to dissent from th
in child-bed fever. I shall, therefore, speak
withstanding I am convinced they will be co
stances promptly rejected, and even with dis
the question to be a most important one, inas
cept the notion of a contagious origin, we oug
sequences of that dogma. Certainly, that ma
and wicked wretch, who, believing in the cont
should yet continue to exercise his ministry,
death and desolation into whatever family he
the part of the obstetrician. For, if one ca
other must also be communicable; and such a b
and honesty to desist from, or to suspend hi
soon as he happens to be called to any case.
dress, and purify his person, and then go li
with him, wherever he goes, a peripatetic doo
it is his dress that poisons—the malady is co
person, and not from dress to dress. Let hi
visit another patient until a long and perfe
made him no longer dangerous as the upas. I
case, let him stop again in time. Certain wri
tion betwixt sporadic cases as non-contagious
highly contagious. But, who is he can dis
case, that destroys, and an epidemic one that
like manner? Whether the woman perish
epidemic child-bed fever, the signs, seats, lesi
cisely the same as to the victims, and the po

gion must be identical. It is useless to cavil with me on the facts. Nothing is more false than what are called facts, since nothing is so difficult as to know what a fact is. The lawyers know this, and even their cross-examinations leave them in so great an ignorance, that the jury vote is always a matter of doubt—and even when given, often wrongfully given. I have carefully read the cases, considered the arguments, and witnessed many of the events upon which so confident a belief of the contagion is founded—and I aver that I do not discover any force in them, that ought to convince me of the contagious nature of the disorder; wherefore I utterly reject and deny the doctrine as one injurious to the profession of medicine, and pernicious to the people, by filling the minds of interested parties with alarm, and propagating, from age to age, a vile superstition as to the nature and causes of many diseases.

Should the Student ask me how to explain the curious occurrence of cases in the practice of one medical gentleman, while his neighbor meets with no such cases, I cannot account for so great a mystery; one which evinces rather a strange coincidence of accidents, than a peripatetic causation by the doctor. I prefer to attribute them to accident, or Providence, of which I can form a conception, rather than to a contagion of which I cannot form any clear idea, at least as to this particular malady. To show how such things do happen, I will here relate an incident, which at the time of the occurrence made a powerful impression upon my mind.

A medical gentleman of my acquaintance left a patient whom he had just delivered, and immediately crossed the street, where in a house opposite he delivered another woman very speedily. The lady first mentioned was seized with epidemic child-bed fever, and died; the second one got well without the least accident. He was then in the height of an epidemic, which seemed to single him out from among his brethren as meeting with these dreadful cases, of which they had none in their practice. The question may be asked, how happened it that, if he conveyed the poison, he did not convey it to both these women? It is true the Student may reply he was poisonous, but only one of the women was susceptible; and the proof that he was poisonous is contained in the fact that he lost sixteen women, whereas other men lost not one. If the Student replies after this manner, let me say that, within a few days after the above-named occurrences, he invited me to visit with him a woman, more than two miles distant from the beforementioned dwellings, and whom we found moribund with child-bed fever. He was greatly affected by thus finding his patient in the article of death, and as we left the door together, he said, "Am I not singularly unfortunate? Here is this poor woman now dying, while in yonder house, a little way off," pointing to it, "lies another patient of mine, who is likewise dying. What a singular coincidence of cases! That case, over yonder, is one of a woman whom I have repeatedly assisted in her labors. A good while ago she sent me a message to engage me to wait upon her about this time. Having heard nothing from her, and being anxious on account of this epidemic, I called at the house to-day, to learn if she was well. I was told that, having been suddenly seized with labor, and rapidly delivered, they had not been willing to trouble me to call. That she had continued quite well, but now was very sick, and would be glad to see me. Upon approaching her bedside, I found her irrecoverably ill with child-bed fever, and she is actually in a dying state."

Such was the statement of my medical friend; and I have related it in order that I might next ask the Student to see, in the circumstances of the case, the undeniable proof that strange, inexplicable coincidences may cause one medical gentleman to be tracked, as it were, by child-bed fever cases, without any complicity of his person or clothing in the causation of them. In this instance, he had not seen the woman until he found her perishing; in the other, if he gave the malady to Mrs. A, and did not give it to Mrs. B, did he communicate it to Mrs. C? and, if he did, where did Mrs. D find it? I said he lost sixteen patients out of a great number. Did he give it to number one? No. Did number one enable him to transfer it to number two? No. Why should the Student believe (he cannot know) that he gave it to number three, since number four unquestionably did not receive it from him? Well, then, if number four did not receive it from him, why should the Student charge him with giving it to five, six, seven, eight, nine, and so on to the last of the melancholy list? For my part, I am sure he neither did nor could communicate it to anybody. If the Student still insists that he was the conveyer of the poison, how did he convey it? Had he himself the disease? No. Did he convey it in his clothes, or hair, or scarf-skin, or pulmonary or cutaneous halitus—which of these? But another friend of mine who had been *chased*, so to speak, by a series of such cases, seventy in all, left the city, was absent many days, and on returning, shaved his head, got a new wig, new clothes, new gloves, new pencil. He next went into a bath, was washed clean, dressed himself, and then visited and assisted a woman in labor who was seized *next* day and died. Prussic acid, or arsenic, or nicotine, would hardly be more poisonous than such a gentleman, if he *was* poisonous, which he was not; he was only unlucky in meeting with the epidemic cases. I say he was not poisonous; but, if the Student insists he was poisonous, pray, how was he so? Not in his hair, which was cut off; not in his dress, it was new; not in his health, for he was in good health; everything, except the man, was new. He could not have carried the atmosphere of his last patient's chamber with him to the country; kept it about him like an invisible cloud, during many days; and then, after a bath, carry it into the last patient's chamber to destroy her with exhalations more pestiferous than the breath of Cacus. I have just now, since writing the last sentence, read again the observations upon the contagion of child-bed fever, by Dr. Robert Lee, beginning upon page 487 of his admirable *Lectures on the Theory and Practice of Midwifery*, 8vo. 1844. No author has given or can give a clearer or more candid detail than his of the motives to believe or reject the contagion, as a cause, as far as those motives are discoverable in the observed cases. The esteem and veneration I feel for that wise and good man, Dr. Lee, are so great, that, if I could believe because any living physician believes a dogma, I should believe it because he does. But Dr. Lee does not believe; he only suspects and fears. At page 489, he says of the facts, that, "though they have led me to adopt the opinion that the disease is sometimes communicable by contagion, and sometimes has a connection with erysipelas; they have not, perhaps, been sufficiently numerous, and of so decisive a character, as to dispel every doubt on the subject of its contagious or non-contagious nature, and prove that it is a specific inflammation. It is but right to state that, in a vast majority of cases, the disease has occurred, and in the most destructive form, where contagion could not possibly be supposed to have operated as the cause."

Dr. Lee gives a summary of opinions of past writers, whom I shall not cite for want of space in this volume.

Let not the Student charge me, then, with ignorance of the facts relative to the so-called contagion of our dreaded disorder.

I am by no means ignorant of them, as stated by numerous authors; and have, moreover, conversed on the subject with many of the most eminent living accoucheurs, both at home and abroad; so that I am ignorant neither of facts nor opinions; yet, I wholly reject the contagion of scarlatina, measles, and pertussis, as I do that of yellow fever and cholera. And I shall here take the liberty to excuse myself to my brethren who have opposite views, beseeching them to observe that, while I contend for the faith I have, I do not condemn *them*, however

I may dissent from their *opinions* on these points. Let them therefore, in like manner, condemn and confute my *opinions* on child-bed fever contagion, and, if possible, pardon *me*.

A man living by the edge of a swamp or mill-pond, in September and October, is very likely to have an attack of intermittent fever. A marsh-miasm makes him sick, and that after a particular manner. But what is the marsh-miasm? No man hath answered that question; and yet, everybody agrees there is some unknown relation betwixt the swamp and the morbid phenomena observable in the man, and that unknown relation is expressed in the word miasm. In like manner, a woman delivered in a lying-in ward of the hospital, falls sick with child-bed fever. She is the first on the list; but her case may be followed by ten or by two hundred other cases. As to the marsh-miasm, I know it not; I only know that it is; and, in like manner, I know not what the ward-miasm is. I do know, however, that it is. The marsh-miasm makes sick unto death. The ward-miasm makes also sick unto death. A hundred men shall fall sick in the Valteline, or in the Campagna, and a hundred women shall fall sick in the hospital. Which is a contagious cause, and which is not a contagious cause? The Student may say he suspects the ward-disease to be contagious, but let him not say that he knows it to be so; πιστις and γνωσις, belief and knowledge, are very different states of the human understanding.

Let the Student say, if he will, I know that Mrs. A communicated her epidemic child-bed fever to Mrs. B, and I know it, because Mrs. A died on Wednesday in the same ward with Mrs. B, who took it and died on Saturday. If the Student should thus speak, I must reply to him that, as he admits it arose spontaneously in Mrs. A, he ought not to assume that it could not spontaneously arise in Mrs. B. In such a contagious malady as smallpox, if A be sick with it, and B come into his house, and after some days of incubation should fall sick with variola, he has a reasonable inference from A to B, and that inference is confirmed and reduced from belief or probability to knowledge, because he knows he could have taken lymph or pus from A, with which to inoculate B; an inoculation that could scarcely fail to produce smallpox. But, in child-bed fever, he can have no such reasonable inference, since he cannot inoculate B with the malady of A, and knows not where to look for any virus, and has not the least notion of what the cause is. In smallpox, though he cannot know what the cause is, yet he can and does know where to look for it, and he always finds it combined with or contained in the lymph or pus of a variolous pustule.

Inasmuch as we cannot know what the essence of a miasm or contagion is, we ought to examine ourselves—that is to say, we ought to pry into our understanding, and see, if possible, whether, under these mysterious circumstances, there is not discoverable some principle, some law or fact, whether in our own understanding, or in the nature of the patient, which, being duly comprehended, might lead us to an absolute knowledge upon this subject, and so, free us from miserable doubts and misgivings of duty; and to this end, it seems to me that such a self-examination must result in this, namely, that a miasm, or a contagion, can act only on the sensitive element of bodies, just as medicines act solely by the impression they make upon the same sensitive element. As medicines do not act upon the dead body, neither can miasms or contagions affect it. Miasms and contagions are in the same category of powers as medicines.

Every person who has paid some attention to what is called method, or classification in Natural History, knows that the whole of the zoological series have been arranged upon the principle of the subordination of the organs.

"Vertebrate animals possess a trunk, on the sides of which all their parts are symmetrically arranged, because their nervous system consists of a central medullary cone, from each side of which proceed, in symmetrical order, the nerves of all the parts. The body of a mollusk is a lump, because its nervous system is confused; the articulates possess a greater degree of symmetry, because their nervous system is, to a certain extent, symmetrical; their body is articulated exteriorly because the nervous system is so within: in fine, even in the radiated animals, the last vestiges of a nervous system, to be traced in them, have the same radiate form which their whole body has."

"The form of the nervous system, therefore, determines the form of the entire animal, and the reason why it is so is plain; it is because, in fact, the nervous system constitutes the entire animal, all the other systems being added merely to serve and maintain it."—*Flourens.*

The above paragraphs, from p. 88 of M. Flourens' *Analyse Raisonnée des Travaux de Georges Cuvier*, are cited to confirm the proposition that the nervous mass is, in fact, the only part or element upon which medicines, miasms, or contagions can act; and that, if it be true that the animal is what it is, in consequence of the arrangement and distribution of the nervous mass within it, then we may discern, in states of the nervous mass, causes why the organs should become pathological seats, instead of continuing to be the seats of physiological action or force.

The nervous mass, then, is not only the elaborator, but the generator of its organs; maintaining thus health and life, or, losing the reins of its government, allowing them to fall into disease or death.

I pray the Student, *pro hac vice*, to look upon the nervous mass as a unit, with power to assume the form of encephalon and cerebro-spinal axis, sympathetic system, ganglion, plexus, nerve-fibril, or nervous-molecule: wherever it is, it is the unit of the nervous mass, all whose parts are bound into one co-ordinated whole by the centralized power existing in the medulla oblongata.

This unit-mass may extend or protract itself, and evolve itself into the form of optic-nerve and retina, lung, gland, spleen, hand, heart, ear, alimentary apparatus, skin, muscle, capillary vessel, joints; in short, it extends itself and becomes organ, in order to maintain itself by perpetual supplies of material and of oxygen. The organs and all the parts are its machinery, to which it supplies the necessary power, and which it withholds from them when it is itself incapacitated.

If the nervous mass is thus the regent and supreme dominator of all the parts, it can only be so when the necessary conditions of its own normal existence are present; but the nervous mass is subject to induration, to ramollescence and pressure—to too little pressure—to strength—to weakness—to various pathological states, and to death. To point the finger of scorn at a man, arouses in an instant the fiercest passions of his soul. To blast him by some spectacle of horror, is to make every fibre tremble and quiver. To appeal to his human sympathy, is to melt him into the softness of the woman or child. To heat him with wine, to anæsthetize him with chloroform, to cast him under the therapeutical force of antimony, or mercury, or opium, is to alter the state and force of his nervous mass. To place him, in autumn, near a Southern swamp, is to bring his nervous mass under the altering influences of the malaria: but, to deliver a woman in a lying-in ward, filled with the cause of child-bed fever, or in a town or district wherein the cause of child-bed fever is become, by some constitution of the air, epidemical, is to modify, by means of the malaria of the town or ward, her nervous element; to the end that, after delivery, she shall give manifestations of this morbific power in a peritonitis, or metritis, or metro-phlebitis.

Let not the Student invite me to show what are the modifications of the nervous mass, brought about by the ward-malaria. I know them not—any more than I know the modifications of the encephalon effected by the operation of the causes of rage, terror, sympathy, or heaven-descended charitableness that divides its cloak with the beggar. *Medicina non agit in cadaver* is a true saying. What modification is it of the nervous mass, that leads to the therapeutical effects of ipecacuanha or tartar emetic doses? Again I say, *medicina non agit in cadaver*.

As to states of the nervous mass brought about by means of the epidemic cause of child-bed fever, their existence will not be denied by the contagionists—who, at most, only accuse physicians and nurses of transferring, by their person or dress, the *cause* from patient to patient. These very contagionists contend for some identity in the causation that renders the congener, erysipelas, rife during child-bed fever epidemics. But they contend not for the contagion of this erysipelas.

Contagionists will hardly contend, that an incubation of a few minutes can suffice to awaken the fatal train of symptoms—but, and here is the rub, in epidemic child-bed fever, women are sometimes attacked, sickened, and destroyed within twenty-four hours, or even within eight hours, after the close of the labor. Kiwisch has observed this frightful rapidity of extinction. Puzos and many others have seen cases to prove fatal in twenty-four hours. Epidemic constitutions of the air may so affect the state of the nervous mass, as to give a wide-spread reign of synocha, or typhus, or yellow fever, or plague, or cholera, or black death, English sweat, or child-bed fever, whether synochal or typhal: during the reign of a great epidemic, only those that fall sick appear to have been brought within the range of the causation. Yet it cannot be doubted that, of a population consisting of 100,000 souls, among whom 5000 only manifestly fall sick under the epidemic, the multitudes of the population who have resisted the cause, though exposed, greatly exceed in number those who have been disordered by it. In a crowded lying-in hospital there are many servants, and pupils, and physicians, and other officers. There are also many unmarried women, as, for example, Sisters of Charity, who wait on the sick. Ofttimes the lying-in wards are nigh to fever wards, or wards for the wounded. How is it, then, that this potent contagion, which destroys like the most virulent poison, even in a duration of only eight hours?—how is it, I ask, that other human beings, females and males, are never even suspected to be in danger, while a pregnant and lying-in woman is looked upon as in the greatest peril while she stays in that house; breathing the same air; living on the same food; and in all respects, save her pregnancy and lying-in, in like circumstances with the other non-pregnant women and virgins by whom she is surrounded, and who maintain their perfect health. If the contagion is a contagion, it must be a specific one, and very curiously specific, if it specifies only the *accouchée*. How can the Student regard it as specific? How can he, in fine, hold it to be a contagion? Is there a contagion specific to the pregnant woman, and of no power over the bodies of other women, of children and males? As well might the Student say that pregnancy has changed and subverted the specific character of the woman. It would be nonsense to say so.

But, if the Student should incline to say that the cause, though it may have been originally generated within the house, as marsh-miasma is generated in the swamp, is yet capable of reproducing itself in the economy of the sick woman, and so become contagious; nay, that it may even be transported by her medical attendant to considerable distances, he ought, at least, to say that time is required for the operation of the cause. Such operation cannot be instant, and without incubation. Smallpox, whether taken by ordinary contagion or by inoculation, and syphilis also, must have an incubative stage. But, in our disease, the woman may be attacked and lost before the lapse of twenty-four, or even eight hours. Will he still incline to say, that the physician carried the poison from the last patient and killed the woman in eight short hours? It seems to me that this statement serves to show that the woman must have been brought under the range of the cause before the commencement of her labor; and, if so, then certainly not by any infection conveyed by the attendant; but only by the epidemic force, which may have been acting upon her nervous mass for many days. How many days? Shall we say one day, or a week, or a fortnight? But, the cause of epidemic child-bed fever covers, like an overshadowing cloud, a whole city, state, or continent. It may have silently operated for a month or more before the explosion.

Is there not idleness in looking to a human contagion as the cause, when we know of a surety that epidemic constitutions of the air may comprehend within their morbific scope thousands or millions of the population who shall not in a single instance sicken under it, except after the application of a proper and competent exciting cause?

I repeat that the epidemic-cause of child-bed fever cannot affect any others than women, pregnant or lying-in; it must, therefore, be a feeble cause—else it would produce disease in unmarried women and girls, as well as males. Still, it is powerful enough so to affect the nervous system of pregnant and lying-in women as to give them a propensity to be seized with these puerperal phlegmasias. The three forms of child-bed fever are each pure forms of non-specific phlegmasia. They are terrible in their rapidity and mortality, because the lying-in state requires only that a disk, an area of inflammation, should be once established; which being done, the area expands like the circles of wave in a lake wherein one has cast a pebble. The motion is propagated to the shore.

It is not improbable that those states of the mind that are brought about in pregnant women, by rumors of numerous fatalities, may exert an injurious influence upon the nervous mass, which becomes weakened and disordered by states of the soul, inviting to the attack. I heard of a soldier who was sick in Mexico. He longed to return to the United States. The physician who examined him found him little indisposed. The soldier had the keenest desire to visit his home, and said, "Will you let me go home, sir?" Being roughly refused, he turned his face away, and was dead in a few moments. Now here was a case in which a word conveying a bitter disappointment caused the nervous mass of a man to lose its bond of union with the organs. It resigned its authority over the dominions it had controlled, and a momentary anarchy led to their total dissolution. Is it wonderful, then, that a woman, whose ears are filled with the dreadful reports of epidemic child-bed fever, or whose eyes have witnessed the dissolution of numerous inhabitants of her own hospital-ward, should allow a non-specific inflammation to fix itself upon the womb, or ovary, or venous sinus, whose area, augmenting like the wave-circle in a calm lake, should speedily reach and disturb every organ within the abdomen?

I shall now proceed to describe the appearances presented by a woman attacked with child-bed fever, having, perhaps, at immoderate length, stated my views in general upon the nature, seats, and causes of the disorder.

For the most part, a woman who has been confined, and who has got quite rid of all the uterine products of the gestation, shall remain in a quiet and comfortable condition, as soon as she shall have somewhat recovered from the fatigue of the conflict, and got over the smarting and aching sensations left by the transit of the child through the organs. If she has now been confined for the first time, she is little apt to suffer from those after-pains, with which those are troubled who have borne children before.

The blood shed by the empty womb, flows out upon the napkins placed to receive it, and if a few small coagula should happen to be formed within the uterus or vagina, they are in good time expelled; and the pulse, the respiration, the temperature, and psychical state of the woman present no motives why we should apprehend an attack of disease. Twenty-four hours pass in this quiet way. Perhaps the lower belly is somewhat sensitive to the touch, but it ought to be a little so. She takes light food, and convenient drink. She is kept neither too

cold, nor too warm. She does not leave the bed,
She sleeps well. She has applied the infant t
given a little milk. Forty-eight hours pass in th
the milk gradually increasing. She sleeps durin
second night, but at four o'clock in the morning
the child; she observes that there is a degree of
ness in the hypogaster, as she turns to adjust the
chilly, a rigor of positive character comes on, whi
to an ague-fit, with chattering of the teeth, trem
distressing coldness along the spine; the fingers
are cold to the touch, and now the pains in the uteri
severe. She no longer can bear to have her bind
suffer the nurse's or her own hand to be pressed u
times these pains are so violent as to draw crie
alternated with the moanings from her lips. She l
draws up the knees, for she cannot extend the le
the pain in the lower bowels. If she have occasion
or turn in bed, she does so with great precaution, be
of posture augments the distress. If she happen
she seems to feel that something within falls hea
and draws or drags other parts painfully along
fleshy, and sensitive womb. If she should happe
occasioned by the effort and shock is unspeakable

In half an hour, in an hour, or in two hours, l
is gone off, and the face is become red, the han
the respiration is quick and short. She can no
breath, because, in doing so, the great descent o
rudely and painfully moves the parts beneath it
or upon the sensitive areas of the phlegmasia, w
great disturbance. Hence, she breathes with a
respiration.

If, during the rigor, the pulse is counted, it w
one hundred and twenty or one hundred and fort
the artery being small and wiry, with a quick and
systole. As the chill goes off, the pulse increase
little in frequency, as the hot stage begins to de
stage makes progress; the area or inflamed dis
does so, causes the woman to experience freque
rigors, that are insufficient, however, to arrest th
stage. In proportion as the area of phlogosis
constitutional reaction against it augment. Th

becomes more and more energetic; the systole is more frequent and sudden; the temperature of the body increases in the same ratio, and the hot stage is soon fully established. During the excitement of the hot stage, the area of inflammation expands rapidly.

Under the predisposing conditions arising out of the woman's puerperal state, this reaction spreads out the area of inflammation more and more; it transcends the boundaries of the pelvis, where it was first established; it migrates upwards upon the peritoneum covering the iliac muscles; it inflames the serous coat lying behind the muscles of the belly; it creeps up along the surface of the rectum, and the sigma of the colon; it burns like a raging fire in the loose and movable peritoneum of the omentum: the whole colic arch is inflamed; the meso-colon, the mesenteric, and intestinal peritoneum are involved; it takes hold on the stomach, passes along the serous lining of the liver, and fastens itself upon the vault of the diaphragm, and the abdomen becomes distended almost to bursting. Under the destructive power of such a complication of inflammations, the nervous powers succumb. The belly has become tympanitic; the respiration and calorification are disturbed and lessened; and the blood becomes more and more venous in its character, as the neurosity grows less and less under the lessening aëration of the blood. The countenance and the skin undergo the remarkable changes so often signalized. The stomach gives way with eructation, regurgitation, vomiting of yellow, green, blackish fluids, and lastly, black-vomit. The nails are bluish, and the lips also; all pain has ceased; the pulse grows small, thready, vermicular; it ceases at the wrists, elbows, and axillæ, and at last the heart lies still; the woman is dead, the child an orphan, the family altar is overthrown; as the divinity that presided there takes its flight to the unseen world.

This is a picture of the progress of a child-bed fever assuming the form of puerperal peritonitis. The sketch I have presented is a rapid one; but it seems to me that many women have begun and matured the whole progress of the events I have related, in a little more time than I have employed to write these words. In general, however, the rate is not so rapid. As a general rule, my cases have begun a little later, as at the end of the third day; so that I suppose the seventieth hour is more likely to give rise to the first symptoms than the forty-eighth hour after delivery. Still, it is not to be denied that, in multitudes of women, the area of phlogosis is first laid during the labor, or even before the commencement of it.

I hope the Student will allow me now to remind him of what I have before said, namely, that the serous coat of an abdominal viscus or organ is an essential part of such viscus or organ; and that inflammation of the serous coat is, virtually, inflammation of the organ itself. But, in my statement of the progress of the disorder, I have asserted that the original area of the peritonitis has become expanded, or that the inflammation has migrated beyond the bounds of the pelvis, and has at last fastened itself upon each and every of the abdominal viscera and the diaphragm. This I regard as a true account of any one of the bad cases of peritonitis. The Student would expect, even were the area of inflammation confined to the limits of one broad ligament, a very hazardous constitutional reaction from it; what shall he expect when every viscus is become inflamed by the progress of expansion of the area?

The extension of the original area of inflammation is therefore an extension of it to the organs within the belly; and we ought to expect that the symptoms will rapidly assume a graver character when the whole peritoneum of the colon and small intestines becomes involved. The peristaltic muscles, lying underneath their serous coat, must lose their power, and the whole tractus of intestine must become distended with gas, just as a paralyzed bladder suffers itself to be filled to bursting with urine, upon which it cannot contract, to expel it. In like manner, the inflamed bowel fills with gases extricated within them, so as to produce, first, a state of meteorism which soon becomes an enormous tympany. In a short time after the inflammation has ascended upon the bowels, the woman's abdomen begins to expand, and then speedily becomes larger than it was before the birth of the child. I have seen some women in whom the abdomen was tense as a drum-head, and perfectly sonorous under percussion.

The nervous system ought very soon to succumb under the torment of such a vast area of inflammation; but there is another influence that tends quite as rapidly to sink it under such circumstances; it is this: the diaphragm has not free play any longer, to descend, as the respiratory piston, to the proper point in the cylinder of the trunk; for, whenever the woman would make a free aspiration of air, she is prevented by the pain; for as the diaphragm goes down, carrying everything beneath it in a downward direction, its pressure upon the inflamed bowels gives rise to torturing pain, so that she will not, if she can, and cannot if she will, take a full and perfect breath. To breathe imperfectly, is to oxygenate the blood imperfectly; and hence, this great and painful tympany soon comes to interfere with the aëration of the blood, and consequently with the innervative power, which depends upon it. The constitution thus sinks rapidly under the double influence of a tendency to slight asphyxiation and an intolerable burden of perceived irritations. All the writers notice a peculiar expression of the face in women in child-bed fever. The countenance has a slight leaden hue, which it acquires in consequence of the imperfect aëration of the blood just explained; and this it is that gives the peculiar child-bed fever physiognomy, so much spoken of in the books.

Moreover, when the bowels become thus greatly distended, their superficies of inflamed serous membranes expands *pari passû*. There is little hope here to effect the cure of the serous inflammation by resolution; it can come to its term only by effusion and adhesion, or by gangrene. The latter result is not to be expected, since the woman must die with an irritation so terrible, even before it could reach the point of passing into gangrene.

In some women, as soon as the bowels have become thus greatly inflated, a total stoppage occurs by what I have called angulation of the gut. For example, if the portion of the jejunum or the colon should be greatly distended, its returns, instead of being effected by arcs, are effected by angles; but a hollow cylinder, suddenly bent at an acute, or even right angle, will shut its cavity at the angle, so as not to allow even gases to pass. If the Student would roll up a sheet of paper into the form of a hollow cylinder two inches in diameter, and bend it so as to make an acute angle at the return, he will find that he cannot even force his breath through it. This is what happens in some of these cases. The obstruction becomes absolute and complete, so that neither liquids nor gases can pass, and the woman dies as surely as if a ligature were applied and strictly tied round the gut. I have met with such instances, and proved them by dissection. No medicine can operate. The largest doses of calomel, senna, jalap, salts, croton oil, or elatin, are alike unavailing, for such angulation of the gut is a mortal accident. I saw a woman, attacked at 4 o'clock A. M., who at 11 A. M. was dying, under these very circumstances. It was in vain that any efforts to rescue her were made.

While these consequences flow out of the serous inflammation of the intestines, what must be those resulting from the serous gastritis? Every person who has witnessed the cases must be familiar with those fatal signals that are early presented in the gastric eructations of thin mucus mixed with ingesta. Soon after which comes a yellow-tinted fluid, that comes at last to be greenish, verditer, dark green, darker, black and granular, and at last black-vomit. These are the signs and fruits of an inflamed and dying stomach and duodenum.

Why need I further cite the serous hepatitis and paraphrenitis? It is enough to say that we have allowed the area of phlogosis to expand, to mount above the plane of the superior strait, and invade, as a fire in a prairie, every tissue that can be a fitting prey to the flame!

The Student has here, as I hope, acquired a clearer view of the nature and progress of a case of child-bed fever under the most ordinary form of puerperal peritonitis; and what I most desire is, that he should solemnly reflect upon the idea of an area of inflammation beginning within the pelvis, of a small superficies at first, but allowed by him to transcend its original limits and at last pervade everything within its reach. I feel sure that he will not look with surprise upon the woman who, under such circumstances, seems to sink without a struggle for life, her functions perishing, one by one, until the medulla oblongata at last ceases to excite the motor cord of the vagus nerve, which is death.

In the progress of the various operations I have depicted, the woman reaches a stage of the inflammation in which nature attempts the cure by effusion. As soon as the serum and sero-pus, and copious albumen begin to exude from the serous surfaces, the pain is mitigated, becomes rapidly less and less, and is soon all gone. The belly still continues to be large. If angulation has taken place, it will never subside; but if not, then, when the effusion has occurred, the abdomen becomes softer and less resonant, but still continues much distended. The inflammation is at an end, and it has come to its term by means of the act of effusion. By percussing the abdomen, we can now discover that the peritoneal sac is filled with a fluctuating liquid, and we know that the signs of melioration, so joyfully hailed, are but the disguised harbingers of doom. If the Student should read Gordon's account of the case of John Low's wife, he will have a most touching picture of the treacherous nature of this euthanasial melioration. When the effusions began, her great pain ceased, and, upon the doctor's arrival, they "received him with transports of joy;" but he saw that his patient was dying.

The Student ought very carefully to obtain a correct diagnosis of the conditions of a woman recently delivered, and who complains of indisposition. If he should make an early and correct diagnosis of the incipient areas of inflammation, which I have supposed to be the true beginnings of child-bed fever, he could scarcely fail of success by a resort to the Gordon method, to be hereafter described. And I advise him to give his patients the benefit of any doubt that may be left after a due exploration of the signs; that is to say, if he remain in doubt whether the malady be inflammation or not, let him proceed with his method as if justly afraid of the existence of a veritable inflammation.

One of the most constant signs is a remarkable frequency and quickness of the pulse, with which, however, he cannot become familiar by mere book learning. One must feel the child-bed fever pulse in a few cases in order to become familiar with the peculiar and informing impression it makes upon the sense of Touch and the mind. I shall no further attempt to describe it than by saying that it generally beats at least 120, and often 140, or even 160 strokes to the minute. The volume and resistance of the artery vary, even in the early stages, according to the constitution of the patient, the violence of the phlegmasia, its extent, and the force of the epidemic cause, or other cause.

Let the Student make the diagnosis between milk-fever and child-bed fever. Milk-fever may be accompanied with after-pains, with rheumatism of the womb, or with pure neuralgia of the pelvic and abdominal viscera, strangely connected with a tenesmic condition; or with retention of urine, or with retained coagula, or costiveness.

I have met with many cases of child-bed fever, for example, that were by no means child-bed fever, but only pain and irritation in the pelvis and belly, and a quick pulse and hot skin, caused by a tenesmic descent of the recently gravid womb. In such cases, the abdomen is as tender and sore as it is in the most violent peritonitis, but it is instantly relieved by pushing the uterus upwards with two fingers in the vagina. If he have doubts about it, let the Student, therefore, clear up his diagnosis by raising the womb upwards in the pelvis, and then by striking upon the sore abdomen learn that the operation has wholly taken away all the pain and soreness, which it could not do if they were the symptoms of a real phlegmasia, instead of a descent of the womb. But, as I cannot devote, in this volume, a space sufficient to write a treatise *in extenso* upon our disorder, I shall rest content with having indicated the above-named subjects of diagnostic research.

What can we do in these cases of child-bed fever? What is our duty? Who shall show us any good? The profession is utterly divided upon the treatment that ought to be adopted. And I am quite sure that what I shall recommend will meet with reprobation in many quarters. Yet there ought to be, and there must be, a reason and a philosophy that ought to guide all scholars upon a question that seems to be so simple. Instead of this unity of thought and purpose, we are divided; and the Scriptures tell us "that a house divided against itself cannot stand."

I may venture to enumerate the following as the principal remedies in vogue for the cure of such cases as I have described:—

1. Blood-letting; 2. Leeching; 3. Cupping; 4. Emetics; 5. Cathartics; 6. Stuping; 7. Blisters; 8. Turpentine; 9. Opium; 10. Mercury; 11. Tartar emetic; 12. Enemata. These are all that are in common use. In order to seek for some choice of method, I shall inquire *seriatim* into the utility and reliableness of each of them.

Blood-letting.—It appears to me that whosoever shall accept those views of the nature of child-bed fever that have been herein set forth, must also regard the use of blood-letting as an indispensable element of any method of cure for the disorder. The Student, who truly desires to become acquainted with this great subject, will have examined the history of medicine, and will have made himself familiar with the literature of the subject. He will have learned that, so far back as the age of Hippocrates, the abstraction of blood was relied upon as the most hopeful and safest recourse; and that, throughout the lapse of the centuries of medical history, there have always been some physicians to trust in chief to this remedy. It could not well be otherwise with men who had taken advantage of occasions to examine the nature and extent of the inflammatory lesions exhibited in the dead body. Eucharius Rhodion, Mauriceau and Guillemeau, Lamotte, Puzos, and many others, were persons who had clear views of the phlogosis of child-bed fever, and they became in consequence good bleeders; bleeders *coup sur coup*, as Puzos expresses it.

The notion, the false notion, that the disease is a fever, still continued to mislead, as it still does, many good and wise men; and even of those who clearly perceived the phlegmasia, not a few appeared to have been dominated by the notion of a fever to that degree, that, while they boldly advocated venesection in their writings, they became appalled in presence of the cases, so that their practice, as in Leake's case, and Denman's, fell far short of their promises and expectations.

It chanced that, in 1789, an epidemic child-bed fever began to prevail at Aberdeen, and in the neighboring villages and districts, which proved fatal to many women. None of the medical men then in practice at Aberdeen were acquainted with the disorder, though the same epidemic had been fatally prevalent there in 1760; but the practitioners of that date were now all gone off the stage.

At that time there lived in Aberdeen a physician, Alexander Gordon, who was largely engaged in Midwifery practice; he was a person of sound judgment, of great probity, and truly zealous for the truth. The cases that came under his care proved fatal, one after another, so that out of the first seventeen women whom he attended, he lost nine. Gordon had not cleared his understanding from the pernicious influences of the traitorous word fever; and therefore, through all the tribulation and distress of so many losses, he was never enabled to behold the simple truth of the case, until, upon the death of Isabel Allan, his seventeenth patient, he procured permission to examine the dead remains. The following is his description of what he observed. Let the ingenuous Student read and carefully reflect upon it, with the view to learn what could, what must have been the state of the serous investment of the belly, that could have led to such effects.

"Upon opening the abdomen," says Gordon, "I found the peritoneum and its productions, the omentum, mesentery, and mesocolon, in a state of inflammation. The omentum had lost about half its substance by suppuration. The mesentery and omentum, and all that part of the intestinal canal with which they are connected, were very much inflamed. But the disease appeared more especially to occupy the right side; the right ovarium had come to a suppuration; the colon, from its caput along the course of the ascending arch, was much inflamed and beginning to run into gangrene. A large quantity of pus and extravasated serum appeared in the cavity of the abdomen, which, when taken out and measured, amounted to two English pints. The peritoneal coat of the uterus was inflamed, and the organ itself not so compact and contracted as it ought to have been. Upon opening it, its cavity was found covered with a black-colored substance, which at first had the appearance of mortification, but when wiped off, was nothing else than the membrana decidua in the state in which it naturally is about this time."

The truth here flashed upon Gordon's mind. A thousand speculations, ten thousand essays like Hulme's, centuries of fixed opinions that child-bed fever is a pyrexia, weigh less than nothing in counterpoise of these proofs, that it is a phlegmasia.

Henceforth, throughout the remainder of the Aberdeen epidemic, which as I have said began in 1789, and which prevailed until 1791, Gordon walked in a path of light. He emerged from the gloomy and doubtful track along which he had previously stumbled and groped, amidst clouds of error, and accompanied with phantoms of the imagination to mislead and baffle him. He saw that the disease is an inflammation, to be combated by antiphlogistics, of which the chief is blood-letting. But he rightfully judged that, to bleed, merely, is not to cure; for he judiciously resolved, in using the remedy, so to apply it as to kill the malady at a blow—*jugulare febrim.* He considered

that, like the fabled hydra, its multitudinous he
at a blow, and that, if struck off one at a time,
speedily reproduced.

Gordon says: "The method I proved most
ous bleeding soon after the attack of the dise
took away only ten or twelve ounces of bloo
always died; but when I had *courage* to take
four ounces at one bleeding, in the beginning of
never failed to recover." * * * "If, therefore
to a patient in the beginning of puerperal fev
away less than twenty or twenty-four ounces of
otherwise he will fail in curing the disease."
be thought too large a quantity, by those who
than eight or ten ounces of blood from their p
titioners would never cure puerperal fever; fo
venture to take away the quantity mentioned, it
prudent in him not to bleed at all,
will certainly die, and the bleeding will
"And I felt this prejudice in its full force, wh
take away more than ten or twelve, or fourteen
of blood from my patients. But when I had r
or twenty-four ounces at one bleeding, I disreg
sure that that quantity, taken away within six
attack, would certainly cure the disease, and th
be no clamor against the bleeding. But, when
beginning or soon after the attack, I did not
"Now, when I was called early to patients in
had courage to take away twenty-four ounces
failed at once to cure the disease." * * * * "
in the disease, and mature deliberation conce
proper to be pursued in my peculiar situation,
resolution: If called to a case within twelve
I insisted on bleeding the patient, and promise
at a later period, or from twelve to twenty-four
in that case, like Sydenham with the same rem
thought it incumbent on me to propose it as th
but I neither insisted on it nor promised for its

Many valuable publications upon child-bed
since the date of Gordon's work. It is not ver
to be published, through the approbation of D
fessor of the Practice of Physic, at Cincinnati

first, a short article on puerperal fever, by myself, designed as an introduction to the rest of the volume, which consists of the works of Gordon, Hey of Leeds, Armstrong of Sunderland, and Robert Lee of London, on puerperal fever. I have considered that the doctrine of those four authors, as to child-bed fever, is so clear, and so clearly coincident with the facts, and the treatment by blood-letting set forth in a light so true, that it might serve as a sufficient text and guide-book for the brethren in this country, many of whom cannot have access to rich libraries of medicine. I am still of the opinion, that all those who shall truly possess themselves with the contents of that collection, will be well informed and safe men. Safe, I mean, for the public.

While I so confidently recommend the above-named authors, I still more sincerely wish that all the American accoucheurs could read the essays of Tonnelé, of Legouais, of the younger Baudelocque, of Meissner, Kiwisch, and other good writers, who have seen the truth and told the truth as to the phlogistic nature of the malady, and the necessity there is for an antiphlogistic method. I feel sure that few reasonable, well-thinking men could read them without coming over to our opinion. As to the statements contained in the above extracts taken from Gordon, I subscribe to them as the pure truth. And I know them to be true as to my own experience. His experience amounted to seventy-seven cases; mine goes far beyond that number, and all that I have saved have been saved by the lancet. I am indebted in chief to Gordon for the privilege of standing on a platform from which I can look over and beyond the mere signs, and discover the things which they but outwardly represent. In the failing pulses, and amidst all the disheartening evidences of the typhal state, I can look upon the expanding area of the inflammation as the cause, and the sole cause of the declension of the forces, and the overthrow of the functions. If I cannot cure her by venesection, my patient may recover by the providence of God. All other human means seem to me to be useless and beneath contempt, as prime remedies, venesection being omitted.

Hence, my advice to the Student is to learn to confide in venesection as the sole therapeutical hope; but, in the meanwhile, continuing the other remedies, which are but the juvantia and adjutoria of the masterful and hopeful chief and leader in the conflict against this dreadful, most fatal disorder.

Gordon points out twenty or twenty-four ounces as the proper quantity of blood to be drawn in the early stages of the malady. Probably, he has in this hit upon the happy medium, and I most warmly advise the Student to follow him. Still, the question as to a second venesection will often arise, and I am by no means willing to say that another bleeding shall be regarded as imprudent at a later stage. It is clearly incompetent for any man to determine, beforehand, that twenty-four ounces shall be sufficient in all constitutions alike to effect the cure; and certainly some women may bear, and even require to have taken away thirty ounces, or even a larger quantity. What I most desire in the Student, and what I thank Gordon most for, is the earnestness with which he fixes the lowest limit at twenty ounces.

Let the Student read Hey, Armstrong, and Lee, Legouais, Baudelocque, Meissner, and Kiwisch, to discover more clearly, if possible, the grounds for defending the antiphlogistic treatment.

It is true that this treatment is combated in very high quarters, and among others by that most excellent and worthy writer, Dr. Robert Collins, of Dublin. This gentleman's experience, in the treatment of hospital cases, which was considerable, led him to the opinion that bleeding is not the proper remedy for those cases, however much it may be applicable in out-of-door patients. He says, "at least, in *four* epidemics which I have witnessed, the symptoms were usually of the lowest typhoid description, the pulse being so feeble and indistinct, as to make you dread, in many, even the application of leeches," &c.

Dr. Collins had charge of eighty-eight cases, of which thirty-two recovered, and fifty-six died. Only fifteen of the eighty-eight were bled, of whom seven recovered, and eight died. He adds: "The result of my observations upon the treatment of puerperal fever is, that general bleeding, except when there is a strong full pulse, and the symptoms are of a highly inflammatory character, is injurious." Such are the words of Dr. Collins, from which it is plain that he entertains views of the malady different from those I have in this chapter set forth. I look upon the cases of peritoneal form as being invariably dependent upon a primordial area or disk of inflammation, which ought to be limited and then *resolved* by early venesection.

Upon examining Dr. Collins's cases of fatal disease, the No. 60, page 424, gives us the example of a woman delivered at 4 P. M. on the 12th. On the 13th, had slight pain in uterine region; pulse quick; an oil draught. In the afternoon, pain greater; soreness; hurried pulse; moist, white tongue. (The case probably installed early on 13th.) Four dozen leeches, &c. On the 14th, 9 A. M. (say twenty-four hours after the attack), she was in great pain, on account of which four dozen leeches had been applied at 1 A. M. Twenty-five ounces of blood were taken from the arm, which "she bore extremely well," though the venesection did not in the least relieve the pain.

At 9 P. M., the pulse being *full* and beating 138, she was again bled twenty-two ounces, which, with the twenty-five ounces before drawn, makes forty-seven ounces of blood; besides what was taken by four dozen leeches previous to the first bleeding, and two dozen soon after the second bleeding. On the 15th, the pulse 108; on the 16th, 108; 17th, 120; 18th, 120; 19th, 132; 20th, 138; on the 21st she died, at 2½ P. M. In the course of the treatment, from the 12th, the day of her delivery, to the 21st, at 2½ P. M., say nine days, she lost forty-seven ounces from the arm, and had fourteen dozen leeches, four hundred and sixty grains calomel, and twenty-three grains of opium, five warm baths, constant stupes, and occasional draughts of castor oil and turpentine.

The above is an abridged statement of case No. 60, given by Dr. Collins; and I now beg leave to ask the Student to consider whether, inasmuch as the patient bore such large bleedings without sinking, and as she held on in the conflict during nine days, it is, or is not probable that Gordon's method, fully and fairly carried out, would have saved her life. She was delivered on the 12th, at 4 P. M., after three hours' labor. On the 13th, A. M., slight pain in the uterine region; pulse quiet; but at 4 P. M. pain increased, *much* sensibility to pressure; pulse hurried. It was not until past 9 A. M. of the 14th, more than twenty-four hours subsequent to the establishment of the intrapelvic area of inflammation, that the twenty-five ounces were drawn from the arm. Gordon advises us to bleed within six hours, and says we always cure, and I believe him. Nor can I doubt that No. 60 would have been made quite safe, had the venesection been performed at 9 A. M., or even at 4 P. M. of the 13th. Let the Student observe, further, that this was an *hospital case.*

I entertain so great, and so sincere a feeling of respect and veneration for the character of Dr. Collins, that I am prompted to omit the foregoing observations upon his case, No. 60, lest he might misapprehend the feelings that have led me to remark upon it. Dr. Collins is a person far more deservedly eminent in our art than I can ever expect to become, and his services to our science have obtained for him the applause of the whole Republic of Medical Letters. I trust, under these circumstances, that he will pardon me for selecting a case from a high authority, by which (if haply I might succeed) to compare my own views of our duty and policy, in these trying difficulties, with his own. And I must aver that the case in question, coming as it does even from so eminent a source, cannot but confirm me in my adhesion to Gordon, Lee, Armstrong, Hey, Legouais, as well as to the multitudinous convictions of my own clinical opportunities, both in hospital and in town. I ought, however, to be very careful not to conceal any part of the grounds on which Dr. Collins rests. Those grounds are plainly set forth in his work, it is true; but, as some of my readers may not have it in their power to consult the *Practical Treatise on Midwifery*, &c. &c., by Dr. Collins, London, 1836; 8vo., I shall here insert extracts from a letter from that gentleman, which he did me the honor to write in the month of January, 1849.

"Merion Square, Dublin.
"*January* 2, 1849.

"My dear Sir:—

* * * * * * *

"At pages 609–10 (*Woman and her Diseases*), you compare the mortality in puerperal fever under my treatment, and that of my distinguished friend, Dr. Robert Lee, of London, to prove the greater success, where general bleeding had been more frequently adopted by him.

"The GREAT and MARKEDLY DISTINGUISHING FEATURE between Dr. Lee's cases and mine, has, however, been overlooked; as mine were all HOSPITAL PATIENTS; whereas, his were all treated at *their own dwellings*. This was also the case with the late Dr. Gordon's patients, to whom you so deservedly allude.

"The disease with us, and I believe universally, is as different IN hospital and OUT of hospital, as it is *possible* to *imagine*.

"Please look to my observations, pages 390–1–2, &c., where I have stated the patient to be little more than SHADOW, and to exhibit the appearance of those laboring under *cholera;* so as to make us *dread* even the application of leeches. The fever is of the LOWEST TYPHOID character, with the pulse *so feeble* and *indistinct*, as to totally prohibit general depletion. This form of the disease is singularly intractable and truly fatal; whereas, the inflammatory form of puerperal fever, such as usually met with OUT of hospital, may be treated with considerable success.

"I should have stated that few physicians have witnessed the results of general bleeding to *a greater extent* than I have done; as the master of the hospital who preceded me, and to whom I was *Assistant*, was a STRONG ADVOCATE for it; but the mortality was so frightful, he was forced to abandon it. He bled *instantly* and COPIOUSLY, but with the most fatal results.

"Such is the character of almost all our *hospital* epidemics."

I am sure no man will have the hardihood to pretend that blood-letting is a cure for child-bed fever. Blood-letting is not a cure, but a method, and only a method. There will, of necessity, be met with many cases which the method cannot cure. Still, it remains *the* method, and is preferable to all others, and, moreover, so very likely to cure, when duly and timely applied, that I cannot conceive of any other to be compared with it for excellency and safety. Indeed, I reiterate that the case which admits not of this method is one to be cured through the goodness of Divine Providence, and not by the vain means left in our power after the subtraction of the prime and chief of them all. Blood-letting is the most manageable of methods. Nothing equals its power to control the circulation and the innervation, whether of the whole economy or of the areas of the disease.

If the area have already comprehended the whole fundus uteri and broad ligament, a state expressed by rigors, by sensibility to pressure, pain, and febrile reaction, with the pulse at 120 or 140, surely there is nothing that man can do to equal in efficacy those states of the circulation, calorification, impressionability, and motivity, that he can bring about at will, with his eyes on the patient, and his fingers on the pulse, while he lets the venesection proceed. He can stop the jet now, or in half a minute, less or more. He can read the impression he has made upon the nervous, the circulatory, and motor forces, in their indexes in the countenance, the pulse, the heart, the pain, the respiration; and I have no doubt, if a man will take a true, and a dispassionate view of the present and the future of the case, he shall, in the majority of instances, yea, as often as Gordon asserts, wrest the victim out of the hands of the destroyer. But he shall adopt no half measures. He shall not preach copious bleedings with Leake and Denman, and practice small ones like those gentlemen. He shall shut his eyes to the weakness, to the faintness, to the sinking, to the typhus, and open them to comprehend the real extent of an area of inflammation, which, if not incurably expanded, he may hope, or try to cure, but which, with Gordon, he abandons to the powers and resources of nature and Providence, when he deems it too great for his method.

Such are my views, not taken up at hap-hazard and carelessly, but pondered upon and acted upon for more than the third part of a century, in the midst of incessant clinical experiences. I shall never cease to advocate them, as I conceive them to be founded upon true principles in physiology and pathology.

Therefore, I say to the Student, if he have a patient in charge attacked with child-bed fever in the peritoneal form, and if he can come to the bedside soon after the onset, the sooner the better, let him bleed if possible twenty-four ounces, or more, and not less. Let him say, if compelled to desist with the abstraction of twelve, or even fifteen ounces, " She is not safe!" but with twenty-four ounces or more, with an incipient and not too large area of phlogosis, "*She shall* be saved by the method."

In case No. 60, from Dr. Collins, on which I lately presented some remarks, that gentleman, as has been seen, repeated his venesection, and, in so doing, gave his patient the best chance that could have then been presented to her. I admire the boldness of his proceedings in ~~that~~ instance, and I should be happy, could I think the Student would hereafter imitate him in that resolute prosecution of the method. I, of all things, in this relation, most earnestly wish that he would apply the method timely or early; but if he should arrive too late to do so, I mean early, it may yet not be too late to do so. There is a stage at which the method ought not, and will not be applied by any sensible man. When the inflammation, for example, is upon the point of ending in effusion, or when the effusion is already in progress, to bleed can do nothing but mischief. As a general rule, he will be obliged to follow Gordon, who, if twenty-four hours had elapsed, felt obliged to propose blood-letting, though he could make no promises of good from it. This rule of twenty-four hours is sound for the general, but is not so for every particular, for there is no ascertained ratio of progress; whence it might and will happen that a venesection may not be too late on the third day, or even on the fifth or seventh days. Such instances will, however, be rarely met with.

To show that weakness existing previous to the attack is no bar to the use of the method, I may say that I attended a lady here, during an epidemic prevalence of child-bed fever. She had a hemorrhage before delivery, in which she lost no less than ninety ounces of blood, which left her pale and feeble. She was shortly afterwards assailed with puerperal peritonitis of a violent form. In that case, I bled the lady to the extent of bringing down the violence of the pulse, and thereby saved a life, which I am confident must have otherwise been lost. In my essay, introductory to the volume before mentioned, containing the works of Gordon, Hey, &c., I stated a case of peritoneal child-bed fever, in which I bled the patient in all sixty-five ounces, and with the happiest success. I do not believe that the extension of the area of phlogosis is in equal ratios in equal times; nor is the inflammation itself, whatever be its area, always moving to the culmination at a specific rate, like that of a variolous pustule. Hence the rule, not to bleed later than the twenty-fourth hour, cannot apply to all the cases; since, in some, the forty-eighth, seventy-second, or ninety-sixth hour finds the disorder less advanced than it usually is at the twenty-fourth hour.

Leeching.—Many persons who fear to use the lancet have no hesitation to take away blood by leeches. It is doubtless true that, if the quantum of blood within the vessels be diminished, by whatsoever cause, the physiological conditions, relative to that diminution, must wait upon the abstraction. The question, then, as to the comparative usefulness of the two methods, whether by venesection or leeching, is one to be tried by a comparison of the advantages of them respectively. I cannot advise the Student to prefer the use of leeches, because I consider that mode of depletion less convenient, less exact, and therefore less manageable. In conducting the operation by venesection, there is no difficulty in stopping, in temporarily suspending, or in persevering, until, by the well known signs in the pulse, or the physiognomical expression, respiration, hue, and statement of the patient, an opinion is accurately formed. Whereas, in leeching, we cannot stop instantly, nor judge accurately as to the quantity to be withdrawn. Some there are, who advocate the use of leeches on the ground that they take blood directly from the inflamed parts; but the younger Baudelocque has shown, in his beautiful prize essay on puerperal peritonitis, the fallacy of this notion. It is to the last degree improbable that the application of leeches to the abdomen can have any direct influence upon the inflamed capillaries of the mesenteric, mesocolic, or hepatic circulations.

I shall not presume to deny that leeching the abdomen may be a useful method for treating some forms or some stages of puerperal peritonitis. Nevertheless, I may aver that, within the bounds of my own experience, I have nothing favorable to say of it.

Cupping.—This is a method which is excessively inconvenient and inapposite to the cases. Women are, for the most part, attacked within seventy-two hours after delivery; and, at that period, the teguments of the belly are still too flaccid after their late distension to admit of the proper application of cupping glasses.

Emetics.—A singular instance is to be met with in our medical history, of the flattering delusion that follows the announcement of new remedies. At the session of the French Royal Society of Medicine, of September 6, 1782, a memoir was presented exhibiting the results of M. Doulcet's new method of treating child-bed fever. Dr. Doulcet was one day at the Hôtel Dieu, just as the first symptoms of a puerperal fever, then epidemic in that house, beca delivered woman. It commenced with vomi diately seizing upon this indication, ordered anha, which the patient took in two doses. on the following day. The medicine operated a cathartic, the evacuations being followed of all the symptoms. The dejections were p oil-mixture with two grains of kermes, and t

Upon this good success, the chief midwif for the very first symptoms in any future cas upon to proceed with the treatment as abov the engorgement to become established. In fut le même; and en quatre mois, pendant avec fureur, près de deux cents femmes fure all cases the success was similar, and, in th during which the epidemic prevailed furi women were restored to life; five or six onl the emetic, fell victims to their obstinacy." *Hist. de la Soc. Roy. de Méd.*, 1780 and 17

All Europe was gladdened by Dr. Doulcet' and he became at once famous, and but for h after this discovery, honors would have been method was tried everywhere, but everywher gill, reporting upon the cases at the Royal M hints that Doulcet's method might be by ma ventive than curative. Was this a malicious

Doulcet's method is gone clean out of fas that physicians, as a body, anywhere rely at teen grains of ipecac. and two grains of ker fever.

Professor Moreau, while showing me some fever at the Maternité at Paris, in June 184 ally, they met with a form of the disorder Doulcet's method; but I gathered from his s are "few and far between."

After what I have stated in the early part dent will not expect me to advocate the use method. But there are, doubtless, not a f which, beginning under circumstances of a mucous or bilious, of the primæ viæ, might b happy operation of an emetic so gentle an undergo its operation without bursting into copious perspiration during the emesis. An incipient disk of peritonitis might receive a salutary check, and acquire a tendency to diminish instead of continuing to expand its area, under the new nervous excitement and sanguine determination provoked by the impression on the nervous mass, made by this drug, and by the emulging and succussive efforts and shocks of the act of vomiting. I therefore advise the Student not to overlook the properties of ipecacuanha, while casting about for the best means of arresting an attack just begun. It would be both useless and cruel to subject the woman to such shocks after the abdominal peritoneum has become extensively invaded. The pain would be frightful.

Cathartics.—I know that certain persons condemn the use of cathartics in our cases. But seeing that, in general, women go into labor with overcharged bowels, and that, among the earliest mischiefs in the cases, is the tympanitis, that comes on very speedily, I cannot doubt of the propriety, and even necessity, of prescribing cathartics at an early stage, and of repeating them judiciously, in a manner to compel the inflated and blown-up intestines to contract upon and expel the gases that are extricated within their cylinders.

It is certain that I have seen instances rendered intractable by angulation of the gut, as I have already stated; and it cannot be denied that an extreme degree of tympanitic distension does materially contravene the purposes of the respiration, by lessening the stroke of the diaphragm, and thus leading to a *quasi* state of cyanosis, or asphyxiation, which augments *pari passû* with the meteoration of the belly.

There is not to be found, perhaps, a more efficacious cathartic for the commencement of the treatment than calomel in a full dose. Few individuals can be met with for whom ten or fifteen grains of that drug will fail to operate, and it is desirable to have no failure nor long procrastination of the effect. Hence, I advise the Student to exhibit, very soon after he has performed his Gordonian venesection, at least ten, and if the patient is of a good constitution, fifteen grains of calomel, which it is useful to combine with a grain, or even two grains, of opium. In order to insure a complete catharsis, the woman should take, within two hours after the dose, half an ounce of castor oil. After waiting four or five hours for the operation of the calomel, or even, sooner than that, provided the meteorismus begins to appear, she should have an enema of castile soap and water, or one containing an ounce of common salt, dissolved in a pint of warm water.

By this method, the peristaltic muscles may be compelled to contract with such force and for so long a time, as to discharge not only the residua of the digestions and saburral collections, but every cubic inch of those gases, whose accumulation and persistence within the intestinal tubes oppose the fortunate operation of all other remedies.

I believe that Chaussier's method is a good and safe one to be followed after these first operations, viz.: The patient may, from time to time, take a tablespoonful of a mixture, composed of castor oil one ounce, with syrup of rhubarb two ounces, to be repeated *pro re natâ*.

If such operations as these should be maintained judiciously, there will be caused by the method an increased abundance of secretions, whether gastric, bilious, or intestinal, the whole of which must be furnished by the capillary ramuli of the cœliac and the mesenteric arteries. But, as the visceral peritoneum derives its capillaries from those three great digestive trunks, it is easy to see that their circulation must be much relieved by copious mucous and bilious separations from the blood they convey in common with the vessels of the other coats of the bowel, and of the integral tissues of the other viscera of the belly. I shall not dwell further upon this subject here; but, before I lay it aside, I shall implore the Student not to confide the chances of his patient to such hopes alone. They are firm and good adjutors of the method—the method is venesection.

Stupings.—Stupings with very warm water, applied by means of flannels laid over the whole belly, lessen pain, and incite to sweating. A patient will rarely fail to fall into perspiration soon after the application of warm stupes to the belly. But, as this process of stuping is troublesome, and as the binder cannot be conveniently used while it goes on, I prefer to get at the same result by means of very light, but hot cataplasms, such as thin mush of corn-meal, or lint-seeds, mixed with the petals of hops, stewed to a proper pultaceous consistence; or chamomile; or tansy, with fresh mint, combined with the emollient lint-seed, or rasped bark of the slippery-elm. This adjuvant should be resorted to very early, and persisted in until the resolution of the inflammation becomes sure.

Blisters.—Women have recovered who had blisters to the abdomen. I shall never use them. I regard the woman under child-bed fever as supporting a burden of irritations too greatly complicated to be easily borne, and I will not add another so intolerable as this. I grant that women have recovered who were blistered, but do not now remember to have seen more than one such. The physician ought to repeat his diagnostications with every renewed visit to the bedside: to blister the belly is to put a veil betwixt his senses and the operations going on within the cavity. I therefore do not recommend blisters in child-bed fever.

Oil of Turpentine.—A Dr. Brennan, of Dublin, awakened, about forty years ago, the highest hopes of the profession, as to a remedy for child-bed fever, by the successful treatment of cases with doses of oil of turpentine, and the employment of it as an embrocation for the abdominal region. I shall not discuss the question as to the efficacy of oil of turpentine, nor the stage of the disorder in which it is most applicable. Dr. Meissner has given a learned *resumé* of the authorities, to which the curious Student may refer.

Opium.—These cases can hardly be well conducted without the aid of opium as a helper to the cure. I have already signified my approbation of the combination of it with calomel, and doubtless, when our chief evacuating methods shall have been once carried into effect, we shall be compelled, or rather we shall anxiously wish, to obtund the nervous impressionability by a moderate induction of the opium anæsthesia.

The drug may be exhibited in the form of Dover's powders, repeated in doses of three or five grains every hour or two, until the tranquilizing or soporific force of the drug is made manifest; but it will often be found both more useful and more convenient to exhibit the drug as laudanum or black drop, with small starch or mucilaginous enemata, especially when there are great pain and irritation within the pelvis or in the womb. Some persons have relied upon the exhibition of opium in very large doses, frequently repeated, as in delirium tremens. I do not believe such a method will be crowned with a general success.

Mercury.—It is thought that mercurials possess an aplastic power, as it is called; that is to say, they determine the evolution of lessening ratios of fibrine or plastic lymph in the blood. I do not regard this as more than an hypothesis; and it cannot be doubted that where stomatitis or ptyalism is produced by the drug, the evolution of fibrine is considerably increased instead of being lessened. It was formerly deemed desirable, at least by many, to procure an early salivation as a cure for the peritonitis. Hence, women have swallowed from three to nine hundred grains of calomel in the course of a few days, and many have been blistered upon the belly, with a view to get an exposed corpus-mucosum, on which with greater certainty of success to apply the salivating ointment of quicksilver. This appears to me to be a barbarity, and a useless one too, since I conceive that the woman who should recover with it would more readily recover without it.

Antimonials.—A sick person, who is brought under the condign influence of tartar emetic in fractional doses, will be found to have the systole somewhat lessened in force and frequency; but great caution is demanded in the just handling of the drug. If given in excess, it causes great distress from the nausea or from vomiting, and is likely to excite unfavorable relaxation of the bowels; nevertheless, in all inflammatory diseases, the preparations of antimony, judiciously administered, tend to the subduction of the vascular and nervous reaction of the economy against the topical lesions. I cannot advise the Student to trust his child-bed fever cases to the sole power of antimonials, as therapeutical agents; but, after the evacuations have been duly premised, these medicines are, in my opinion, among the most indispensable of remedies.

My own clinical experience teaches me that, in using them, it is desirable to use them just *citra-nauseam*. If they provoke to positive nausea and disposition to vomit, they only add to the load of irritations already sufficiently intolerable. Hence, I am accustomed to use very small doses, as thirtieths or fiftieths of a grain, either dissolved in pure water, or in water along with a minute portion of morphia.

Such a prescription would prove unsuitable in those cases, not unfrequent ones, in which there is strong disposition to diarrhœa. Doulcet employed the kermes after his ipecacuanha doses, and the celebrated Chaussier was accustomed to rely much upon the same article after the evacuations by the lancet and by cathartics.

Enemata.—It appears to me that enemata constitute a chief, and, indeed, indispensable part of the *armamentarium medicum* in these cases. One of the most striking phenomena of child-bed fever is the meteoration, or tympanitis, that attends upon almost every case. It could not be expected that the serous coat of the alimentary canal should be greatly and extensively inflamed without producing its inevitable influence upon the muscular apparatus of the bowels, which refuse to contract beneath the sort of shirt of Nessus that wraps them in the fiery covering of an inflamed peritoneum.

I am not willing here to discuss the question whether the gases that inflate and distend the bowels are secreted or extricated. Be the source of those gases what it may, their presence within the tube is a disastrous accident in many of the cases. I have observed women, attacked at four A. M., to be much more distended at ten in the forenoon than they were in the last days of the pregnancy; and the whole of this enormous distension arose from the presence of gases within the stomach and the great and small intestines. The belly, in some individuals, has been swollen as if it might burst, being perfectly elastic under pressure, and sonorous as a drum. Let the Student reflect upon the aggravation of distress that must exist under such a condition. Let him consider how vastly the superficies of inflammation is expanded by the expansion of the superficies of the bowel, and how great an advantage would be likely to result from any method by which the diameter of the intestine could be reduced to and maintained in its normal measures!

As to the colon, it is at least six feet in length. It occupies the cavity of the belly in common with the small intestines and the viscera. Should the whole colon—six feet in length—come from the tympany, to be larger than a stout man's arm, it is clear that its turns or convolutions can no longer be effected in curves. But the returns must be effected by acute angles, or angulation of the gut; such a distended tube, bent on itself at an acute angle—I have seen three such acute angular returns in the dead body—is equal in its obstructing power to a ligation of the bowel; nothing, not even gases, can pass beyond the point of angulation, and thus the miserable woman has a strictured gut to contend with in addition to all the other causes of destruction.

These remarks ought to show the Student that, while he takes promptly the alarm, upon discovering the first small area of phlogosis, he should at once ponder upon the possible effects of the sure coming intestinal inflation. Cathartics, then, are indispensable, and the practice of Chaussier and others, who so solicitously attended to the due excitement of the muscular apparatus of the bowels, was admirable. But the physician cannot venture to administer cathartics too frequently. Hence the value of the method by enemata. Clysters of aperient mixtures serve at least to compel the colon to discharge the gases that so dangerously distend it, and they should be repeated and reiterated according to the exigencies of the case. Enemata, composed of infusion of lint-seed, mixed with castor oil, or of solutions of Spanish soap, or of mucilaginous fluids containing table-salt, or jalap, or extract of senna, procure the greatest relief, and add to the chances of cure. They fatigue the patient but little, and do not exhaust her strength. Sometimes enemata composed of one ounce of castor oil with half an ounce of oil of turpentine, made into an emulsion with mucilage or white of eggs and water, may procure the expulsion of gases that will not be brought away by any other compound.

For the child-bed fever patient one invariable command should be insisted upon; I mean to say she should not leave the bed, nor sit up for the convenience of the evacuations; even the pillows should not be very high ones, for the patient is safest in a low recumbent position.

In the beginning, let the diet be absolute for twenty-four or thirty-six hours, and after that a light barley-water little sweetened, or rice water, or gum arabic water, with a cup of tea, or milk and water, equal parts of each with a morsel of bread.

I regard oatmeal gruel as beyond expression detestable for such patients; as it invariably, even in women who are not attacked with any disorder, produces great flatulency. To so great a degree does this tendency to flatulency arise, under a diet of oatmeal gruel, that I think I can venture to say few women use it in the first days of the lying-in without suffering more or less from the meteoration of the abdomen. In my *Letters on Woman, &c.*, p. 595, I have quoted a passage from Rainald, or rather from Eucharius Rhodion, on this very subject. The objection to "*ote mele cawdels*," which was so strongly urged in 1540, has been valid against that miserable but universal feed for the lying-in woman ever since that date. I detest it, and protest against it.

A gruel made of Indian meal, or fine South Carolina hominy, is totally free from such objections. A woman who is content to live for a few days on hominy gruel, with a portion of tea and toast, is unlikely to suffer from flatulent distension of the abdomen. Fine cocoa, with milk and stale bread or toast, is a very proper and safe diet.

As the disease advances, whey, chicken-water, beef-tea—but it is unnecessary for me to enumerate articles of diet for the advanced cases.

The Student will, I hope, learn to regard child-bed fever as not fever, but inflammation, and as inflammation commencing with small areas of phlogosis in tissues prepared and prone to admit of frightfully rapid and destructive expansion of those areas. I do not mean to deny that, under the influence of extraordinary virulence of the epidemic cause, and in women more propense by poverty, ill fare, terror, etc., the peritoneum may at once inflame in large patches. Indeed, some of the cases noticed by Dr. Collins, and some that I have witnessed, have led me to conclude that the phlogosis, rarely, commences by a sudden efflorescence on the peritoneum, which, immediately passing into inflammation, causes the nervous mass to succumb at once under such multitudinous and insupportable irritations. So that the woman is well if examined now, and in an hour is found to be irrecoverably ill.

These terrible cases admit of no treatment. Attempts to cure them seem only to aggravate the pains of the dying, and discredit both the physician and his art.

Nevertheless, child-bed fever, even epidemic child-bed fever, ought to be a tractable malady; and I am persuaded will be found so, pro vided the medical attendant should exercise a due vigilance first, and after that a real intelligence and undaunted resolution to carry out in practice the measures deduced from the pathology of the case.

I have no doubt of Gordon's correctness on the subject of early treatment; but that early treatment must depend upon the vigilance of the physician himself. The vulgar notions on physic are not to be expected to put the people upon guard against the earliest rudiments of a malady which often requires only to be set on foot, to run a race so fleet as to defy all attempts to overtake and arrest it.

If Gordon is right in declaring that we shall save the patient if we begin early, let us resolve to begin earlier; let us take measures to insure the application of the *method*—there is but one method—as soon as the signal is given. If we can cure within the first eight hours, how much more may we confide in our powers if we begin with the very beginning! Wherefore, I let the Student watch—let him watch with a panoptical vigilance; and if the chill, the ague, and the pain—if the diagnostic say the area is formed, let him abstract such a quantity of blood as shall compel the heart to beat just as softly, and inject the vessels just as moderately as, in his judgment, he may desire or will it to do. He can limit in this manner the area of inflammation, and at the same time impress upon the inflamed tissue a tendency to recover by resolution, which is safety, and restrain it from terminating in effusion, which is death.

The cases of child-bed fever, in which it assumes the form of metritis or uterine phlebitis, are different in character from those of the peritonitic form. The pain in the metritic cases, though severe, is more dull. It is confined within the pelvis, and does not develop the tympanitic disorder as in the other examples. In its earlier stages there is often exquisite pain, produced by the spasmodic contractions of the muscular apparatus of the womb, in what is called after-pain. Thus, in the commencement, he is sometimes greatly embarrassed by the question whether the attack be merely spasmodic, or whether it be metritic. I advise the Student to endeavor to settle this important doubt. For if it be after-pain, or rheumatism of the womb, it may safely be treated by the use of narcotics, whereas death must follow a mistaken diagnosis of after-pain or rheumatismus uteri, when, in fact, a pure phlogosis of the womb has begun its career. Let him, then, not only estimate the discharges, the place, the pain, the soreness, the breathing, the temperature, the pulse, and the physiognomical character at the time, but let him make the Touch, in order to have a clearer report from the organ itself—so that, if it be indeed a phlegmasia, he may bleed at once, and in a way effectually to fulfil the command, *Jugulare Febrim.*

Uterine phlebitis rarely occurs alone, or uncomplicated with metro-peritonitis. The inflamed state of a vein gives little or even no pain at first. It becomes a painful disorder only when the phlogosis has sunk below the true blood-vessel, or endangium, into the basement tissue on which the membrana vasorum rests. When thus inflammation has passed through the fibrous coat, and has attacked the cellular sheath in which the vessel is inclosed, then the pain becomes considerable. Hence, uterine phlebitis is the most insidious of disorders, and has often attained to an incurable stage, before even the constitution of the woman takes the alarm, and begins to sink under it.

Whenever it shall have acquired a certain degree of intensity, and also begins to be pyogenic, and when corpuscles of pus, washed away from the veins by the torrent of the circulation, are transported to the heart, by which they are injected into all parts of the systemic circulation, this purulent infection of the blood manifests itself, not solely in the rate of the heart's action, which it greatly hurries, but especially by its influence upon the psychical state of the woman.

In pyæmia, we have the strangest hysteroid phenomena. Indeed, one is apt to be grossly deceived; to believe he has in hand a case of hysteria or insanity; but, far from that, he is dealing with a mortal pyæmia, a state in which the blood is charged with pus-corpuscles, that exercise an influence upon the nervous and psychical forces of the woman, closely resembling the effects of arsenic in poisoning doses.

I will not say that pyæmia from phlebitis shall kill; yet, certainly, I believe we cannot meet with diseases more unmanageable. We ought to arrest the malady *in inceptû*, by a Gordonian venesection; if we fail in success, then we must expect the death of the victim, or contend with a long and terrible malady, during which the economy painfully and slowly eliminates the purulent corpuscles, and at last restores the healthy crasis of the vitiated blood.

Pus, thus generated, and thus transported by the circulation, is collected again in the form of cold abscess, which may declare itself, in the course of a single night, or lay the foundation for the most painful and slow imposthume.

I have seen a patient under pyæmia go to sleep at night with her hand in perfect order, and awake in the morning with the whole space between the left thumb and forefinger filled and plump with the pus transported and deposited there in a few hours.

A lady here under my care was seven months ill, requiring daily visits. During that time, she deposited pus in eleven distinct abscesses, and did not recover her health or become wholly free from the pyæmia until a short time before she recovered her health.

In the conduct of our cases of child-bed fever, we should endeavor to make a correct prognosis. It is always unfavorable if we commence the treatment more than twelve hours after the beginning. A violent assault, evincing its violence by great pain, ague, early meteorismus and tympany, rapid expansion of the seat of pain, pulse of 140 per minute, uneasy state of the stomach, altered physiognomical expression, great and early debility, and a presentiment of the patient that she will not recover, is highly unfavorable. On the contrary, a slow expansion of the seats of pain, pulse softened and diminished in frequency, the failure of the meteoration, warm and abundant diaphoresis, fair toleration of the venesection and medicines, a cheerful mind, lessening temperature, absence of rigors, moderate thirst, no eructations—these, proceeding from better to better, shall augur the success of our treatment.

But, inasmuch as I have already drawn out this chapter to a length far greater than I had intended, and as I have put forth my thought upon the nature, seats, causes, signs, and treatment of the malady, I shall now bring it to a close with the earnest recommendation to any Student who may honor it with a perusal, to purchase and carefully to read at least the volume on Puerperal Fever, published here by Messrs. Barrington and Haswell, and which contains not only the precious work of Gordon, but the impayable treatises of Hey the younger, Drs. Armstrong and Robert Lee. Let him read at least these, and as many others as he can lay his hand upon.

Before closing this chapter, I beg leave to refer again to what I said in regard to the action of the epidemic cause upon the nervous mass of animals. The more I reflect upon the nature of animals, the more do I become convinced that all impressions from without or from within are made upon that part of our animal substance that is called nervous substance. I have been very much surprised by an expression of Prochaska, at p. 387, *Prin. of Phys.* by Sydenham Soc., who says "that a nervous system is not present in all animals," &c. &c. It is hardly true that many insects have not cerebra; and though infusory animals are destitute of brain and nerves, it does not follow that they are deprived of, or could exist without a nervous substance. The first of physiologists, Oken, has clearly shown that, even in creatures who are destitute of brain or nervous tractus, there is distributed everywhere in their material, a portion of nerve substance, that serves as the animating principle of all the rest of their material or substance. It seems to me that no person could follow him in his exposition of the psychical homologies of animals, rising from the lowest grade to the highest eminence in the zoological series, without becoming convinced that, even in creatures unprovided with what might be called a nervous system, there is for them abundant provision of nervous mass, which, in my view of it, is the very essence of animality. Changes effected in the crasis or perfection of this nervous mass may well account for the symptoms developed by *epidemic cause.*

CHAPTER XX.

OF ATRESIA VAGINÆ.

The obstetric physician will be likely, in a long career of practice, to encounter cases of atresia of the genital organs.

Some of the cases are capable of giving rise to extreme distress, and even of bringing the life of the patient into danger.

Atresia, or closure, or obturation of the vagina or cervix uteri, may occur as a congenital malformation, or it may take place in infancy or childhood, and may even occur in persons who have borne children.

The obturation may be discovered to exist in any part of the canal of the vagina, whether at the vulva or whether at the uterine extremity, or whether midway of the tractus of the tube.

In the congenital cases, there may have been fault of development, the mucous tissue having totally failed to be constructed. In infants or young children, a slight vaginitis might suffice to determine the cohesion of the opposite walls of the vagina, the occurrence remaining undiscovered until a full puberty, or the state of marriage, should lead to the disclosure of the fact.

To show that it may occur in women who have borne children, I refer the Student to the following case:—

Case.—A woman, from a distant part of the country, came to the city, in the spring of 1837, in order to consult Dr. Randolph, who was good enough to invite me to see the patient with him. Her story was as follows. More than two years have elapsed since she gave birth to a healthy child ; the labor was extremely rapid, so much so, indeed, that the infant was born before the physician could reach the house. The after-birth did not come away for an hour, during which time there was flooding. It was at length removed by force. The woman became very weak. In a few days she was attacked with inflammation of the vagina, accompanied with enormous discharges of matter, and "great thick pieces of flesh," to use her own account. She was never examined by her physician, who, however, directed washes, injections, &c. After a long and exhausting hectic, attended with extreme emaciation, her discharges grew less copious, and she gradually, at the end of some months, got well. There was, however, no vagina, not even a *cul-de-sac;* there was simply the genital fissure. Of course, no catamenia could appear; but, after several months of good health, she began to complain of pain or *misery* in the hypogastric and pelvic regions. The pains recurred with periods of a month, and having at length become intolerable and persistent, she found her health declining, and came, as before said, to consult that able and eminent surgeon, Dr. Randolph.

There was a tumor in the hypogastrium, which reached half-way up to the navel; it was of a firm and resisting feel, not unlike a contracted womb soon after delivery. As there was no vagina, the finger was passed into the rectum, where it came in contact with the same tumor, which seemed to occupy the excavation as it is occupied by a child's head, filling the cavity entirely. Upon separating the labia, there was nothing but the genital fissure; there was no way for a common probe to pass upwards. A sound was introduced into the bladder, and retained there until a finger was also introduced into the rectum: the only texture that separated the finger and the sound seemed to be, upon careful examination, the walls of the urethra and the coat of the bowel; there was no vagina to be felt. Hence Dr. Randolph and I agreed in opinion that the vagina had been wholly destroyed by the sloughing process which took place shortly after her confinement. We entertained no doubt as to the nature of the tumor that occupied the pelvis and lower part of the abdomen: it was the womb hermetically sealed, and retaining in its cavity the accumulated menstruations of nearly two entire years.

After much diligent search, we were unable to discover the cervix, or os uteri; but we supposed it might possibly be turned upwards towards the top of the pubis, so as to elude any investigation made through the rectum alone, the only possible way of making research. No vestige of a vagina was discoverable by the taxis; nevertheless, supposing it possible that the whole tube might not have been destroyed, and that haply its upper extremity might be reached by the bistoury, Dr. Randolph operated with a view to make an artificial vagina, and discover the remainder, if any, of the original one.

Introducing a strong metallic staff, slightly curved, into the bladder, he took his seat in front of the patient, who lay on her back, with the knees drawn up and separated. I held the staff firmly, while, with the forefinger of his left hand in the rectum to serve as a guide, by horizontal strokes of the bistoury he dissected the tissues betwixt the rectum and urethra, and carried his incisions up very nearly to the substance of the womb itself, without having wounded either the rectum or the urethra: when he had completed his incisions, the whole finger could be passed upwards to the bottom of the *cul-de-sac* he had formed by so skilful and accurate a use of the bistoury.

In consequence of our uncertainty relative to the situation of the os uteri, and from his having successfully removed so considerable a portion of the barrier which opposed the escape of the contents of the uterus, Dr. R. suspended his operation at this point, with the following views:—

It was resolved to keep the passage open by the use of a bougie, made as light as possible, and of a size sufficiently large. The bougie was made of silver gilt, about four inches in length, and as large as the thumb, its weight not more than two drachms, being hollow. We indulged a hope that, by using this bougie a few months, the progress of the case would be such as to bring the os uteri to the extremity of the instrument, by means of the increasing expansion of the uterine globe, and that the contents of the womb would discharge themselves into the artificial vagina, or that they might be discharged by a future incision. The lady returned to her own country, and after an absence of three months came back to the city, still suffering under the same misery, with an increased magnitude of the uterus, but without having had any discharge from the vagina. She had constantly worn the bougie. Upon examination, we found that the new vagina was now covered by a smooth surface, resembling a mucous membrane; the upper end of the bougie, when withdrawn, was covered with a sort of muco-purulent matter, tinged with blood. The sufferings of the patient from the distension of the womb were very great, and it was on that account agreed to puncture the organ in order to draw off its contents. On the eighth day of July, 1837, Dr. Randolph and Dr. R. M. Huston, who had been invited by us to witness the operation, met me at the lodgings of the patient.

The tumor, felt through the vagina, was hard and resisting, like an enlarged ovarium; it was softer and the walls thinner, when examined through the rectum. At Dr. Randolph's request, I now made use of a curved trocar, inclosed in a canula, in order to puncture the womb. The trocar was about five inches in length, and of the size of a small writing-quill. The patient was laid on her back near the edge of the bed; I introduced the forefinger of the left hand into the rectum, and, having directed the end of that finger to a part of the tumor that felt most yielding, I carried the point of the trocar along it, and having given it a direction as nearly as possible perpendicular to the surface of the tumor, pushed it through the resisting tissue until I found it had freely entered the cavity of the uterus; the trocar was now withdrawn, leaving the canula in place. There issued from the open end of the tube a dark red viscous material, without odor, of the consistence of meconium, and as adhesive as that substance. The puncture was scarcely felt. In twenty-four hours, during which the canula was permitted to remain *in situ*, properly secured, about twenty-five ounces of this fluid were discharged: the uterine tumor had disappeared from the hypogastrium, and the mass, as felt in the rectum, was greatly reduced in size, and far more movable. As all the liquid seemed to be now evacuated, the canula was withdrawn; no discharge followed its withdrawal. The patient had no symptoms attributable to the puncture. She rapidly recovered her strength, and left the city with renovated health, and nearly free from the misery which had so long embittered her existence. In the course of about a month after returning to her home, she had a very copious discharge, from the vagina, of a fluid of a consistence similar to that which had flowed through the canula, but of a whitish color, after which her health greatly improved. On Tuesday, the 12th of December, 1837, the patient, while on her way to the city, for the purpose of further advice, discharged from the vagina about twenty-five ounces of a substance in all respects similar to that which passed off when I used the trocar to puncture the womb. I was informed, in 1841, that she has menstruated regularly, and has recovered a very comfortable health.

I refer to the ninth letter, page 83, of my *Letters to the Class*, for a fuller account of cases of obstruction of the vagina, than it would be possible for me to introduce into the present work.

Before I close this article, however, I shall take occasion to mention that a careless inspection of the surfaces of the bottom of the vulva might, in some instances, mislead the practitioner as to the existence of an atresia. A lady, already four months married, was presented to me for examination on account of incapability of consummating the marriage rite. Upon inspecting the surfaces, I found in the usual place, at the bottom of the vestibulum, to wit—what I supposed to be the orifice of the urethra; while the tissue, falling downwards and backwards within the genital fissure, seemed to be the anterior wall of the vagina, which had cohered with the posterior wall. The apparent fossa navicularis was shallow, and, upon stretching it downwards, some appearances of a raphe of cohesion were discovered, extending in a semicircular direction nearly up to the supposed orifice of the urethra. In order to relieve the patient, I made some slight incisions into the supposed raphe, thinking thereby to destroy adhesions and make an opening into the vagina. But, owing to the extreme restlessness and agitation of the patient, it was impossible to proceed with the proposed operation. On a subsequent occasion, it was ascertained that the supposed orifice of the urethra was the natural opening at the top of the hymen, which was a very dense, fleshy membrane, an eighth of an inch in thickness. The true orifice of the urethra was afterwards found concealed in a small fold just above this aperture. It was proved to be the urethra by passing a catheter through it into the bladder, while the inferior aperture, scarcely larger, permitted the introduction of the catheter into the vagina. The hymen was destroyed by a stroke of the scissors, and the vagina, an exceedingly narrow one, subsequently dilated with the gilt bougie.

I have never seen so deceptive a case, and I cite it here in order to put the Student upon his guard against the mistake which I committed.

CHAPTER XXI.

ON ERGOT.

I AM inclined to say a few words as to my opinions upon the secale cornutum as a therapeutical agent of great power in labors. It is needless for me to say anything here as to the nature of this substance, which is fully described in a book universally in the hands of the physicians of this country: I mean, *Wood and Bache's Dispensatory.* There is also a very full account of it in Caseaux's new work, *Traité Théorique et Pratique de l'Art des Accouchemens,* commencing at p. 395. I have had occasion many times to witness, during a long-continued practice of Midwifery, the effects of the secale, whether administered with my own hands or by those of others. It has frequently been the subject of conversation among my medical brethren here; and I feel very much persuaded that the general opinion of those gentlemen is one that may be stated as distrustful of the ergot, not as to its want of power, but as to the dangerous nature of that power, whether as regards the woman or the child she is bearing.

The late professor, Dr. James, was perhaps less fearful of its mischievous qualities than Dr. Dewees; the former resorting to it not unfrequently when a failure of power existed, and the latter always presenting against its use the most careful array of objections, except under circumstances pointed out in his Midwifery.

Those who have perused the little volume published a few years ago by a Dr. Mitchell, an English practitioner, who writes in favor of the use of ergot, will feel surprised to witness the audacity with which one person exhibits it at the very onset of labor, or as a preparative or aid in turning, etc., and the extreme precaution recommended by Dr. Dewees, who never sanctions its use as an aid to expulsion, unless the os uteri should be fully dilated, and the child already pressing out the perineum.

Within a few years a good many persons continued to doubt whether the article really possesses the singular and sole quality of exciting the contractions of the womb. I have not lately heard of any objections to it on that score, but they rather arise from the uncontrollable force which it awakes in the womb, leading, as is supposed, to danger of lacerating the organ when the resistance to its expulsive effort is too great, and very commonly to the death of the child.

It is true that I have known laceration of the womb follow the exhibition of ergot, and have on occasions stood by with fear, and expected that horrible result. This is a rare event, however; whereas the death of the fœtus from the rash exhibition of the medicine is a common one, which is reasonably to be looked for, and for the reasons which I am about to state.

In the case of a feeble and attenuated patient, with relaxed and weak tissues, whose labor is lingering merely from want of power, and not from unnatural resistance, I can imagine that the ergot might be safely administered at almost any stage of the labor. But in a woman in good health, whose labor is slow for want of proper rotation of the head, or rendered lingering by rigidity of the os uteri, vagina, or perineum or vulva, or excessive relative magnitude of the head, the greatest degree of consideration should, before resorting to the ergot, be given to the whole case in order to decide which is preferable, the secale, or the forceps or vectis.

Suppose the child so situated or so large that an enormous force is required for its expulsion, and that antecedently to that expulsion some changes ought to take place in the direction of the vertex, &c.; no prudent practitioner would blindly urge his patient to destruction by giving her ergot, without first changing the direction of the head to the required position; and if the soft parts should oppose, by an excessive rigidity, the birth of the child, he would, by the use of the lancet and warm bath, or by stuping the parts, &c., make some preparation for the exertion of the terrific energies of the medicine. Let us think for a moment upon it. A labor is effected by the contraction of the muscular fibres of the womb, aided by that of the abdominal muscles. If all the power employed in a labor could be accumulated in one single pain, lasting as long as all the natural pains do, few women probably could escape with life from so protracted an agony, except that small number who are met with, and whose organs, happily for them, make no resistance, but open spontaneously like a door to let the fœtus ss out.

Now the influence of ergot in a full dose is such that it excites in fibres of the womb a contraction or tonic spasm which is called otism, and which, when once begun, does not cease until the child is expelled, or until the organ has parted with all its irritability, and the spasm ceases from sheer exhaustion of power.

This contraction is so great, in some cases, as to split or lacerate the womb on the projecting parts of the child, or, what is more likely, to tear off the connection between the vagina and uterus, so as to force the child through the rent into the belly. Such a pain may last twenty minutes or even half an hour, without a moment's suspension. Imagine the feelings of the woman.

By a beneficent law of the economy, the pains of a labor are short, not lasting more than thirty or forty seconds in general, and returning once in three or six minutes. Under such pains or contractions, however powerful, the fœtus is safe; for, as soon as the contraction is over, it lies in the womb free from pressure; and the placenta, which, during the contraction, had been violently compressed betwixt the womb on which it lies and the child within the cavity—that placenta, I say, recovers its circulation, and continues, during the absence of the pain, to perform all the branchial offices which belong to it. But, if an ergotic pain is produced, to last thirty minutes, in a case where the placenta is on the fundus uteri, and is to be jammed for thirty minutes against the child's breech without an instant of relaxation, who can doubt that its circulation is either wholly or nearly abolished, and that, when the child emerges at last from the mother's womb, it will emerge quite dead, or in a profound asphyxia, caused by the long suppression of its placental circulation? Multitudes of children are born dead from this very cause, viz., the imprudent exhibition of a medicine which as certainly excites spasm of the womb in labor as nux vomica does of the other muscles of the body.

What I want the Student to reflect on is this. Shall I in this case give a dose of ergot which will excite a spasm of the womb, hoping that the spasm will bring the child into the world? Is the child ready —is its head through the os—has its head undergone the rotation— is the vertex under the arch of the pubis—is the external organ in a dilatable state—in short, is there anything here that could prevent the child from emerging at once, if the whole of the contractile fibres of the womb could be thrown into a strong spasmodic action? No! Then the ergot may be given; for, if the child begins to move as soon as the womb begins to move, it will be born soon, and escape the asphyxia which would certainly overtake it, were it to remain inside of the body, while a long ergotism should be exhausted in vain. The power of the ergot is exerted upon the whole muscularity of the uterus; the contractions that take place under the influence of ergotism affect the fibres of the cervix as truly as they do those of the corpus and fundus; the question then recurs, shall I give ergot in this case, the cone of the cervix being still unconverted into a wide open cylinder, in order to produce violent contractions of the fundus uteri, not doubting at all that the whole of the cervix will be thrown into spasmodic or ergotical contraction, but confiding in the superior power of the greater mass of muscular material contained in the fundus and body?

Michel's cases show that when he administered ergot in the undilated uterus, containing an unbroken ovum, the superior power of the fundus and body rapidly overcame even the ergotism of the cervix, and many of his patients appeared to have escaped well from the rude trials to which he exposed them. There would certainly be less danger in administering ergot in a case where the ovum is unruptured, than in one in which the waters have been already expelled, since the uterus, in such a case, could by no means mould itself upon the anfractuosities of the child's body and fatally compress the after-birth. The practitioner who should dare to drive the uncovered head of a fœtus against a rigid cervix in spasm by means of the mad force of ergotism, is, to say the least, a most untrustworthy practitioner, one who recklessly exposes his patient to the danger of uterine lacerations, and indifferent to the security of the child, and to the poignant distress which cannot fail to result from such an administration.

For my own part, I can say that I rarely give ergot as an expulsive agent: I chiefly employ it at the moment of, or just before the birth of the child, in order to secure, if possible, a permanent or tonic contraction of the womb, after labor, in women who are known in their preceding labors to have been subject to alarming hemorrhage. Of this I have before spoken in this work, and shall take occasion to speak further of it hereafter.

Upon the whole, I must say that I feel far more comfortable, and free from apprehensions for the child and the mother, when I deliver with the forceps, than in waiting the result of a dose of secale cornutum.

The medicine may be given in doses of twenty or thirty grains of the powder, mixed in half a cupful of hot water; or half a drachm may be mixed in six spoonfuls of water, of which one may be given every ten minutes. I think, however, that, when one resolves upon using the article in order to hasten delivery, it is best to give at once a good dose of twenty or thirty grains.

A forceps ought to be at hand. In some cases, when the ergotism is produced, not the smallest tendency to expulsion appears, but the child is held still, under a firm and equable pressure exerted upon all the parts of it still retained in utero. It would die very soon if not released. Hence, I said a forceps ought to be at hand, to save it, if possible, from the fatal grasp of the infuriated organ.

The use of ergot has very much diminished in Philadelphia in the course of the last ten or fifteen years. Few practitioners, when I was first engaged in business in this metropolis, were unprovided with a portion of ergot, which was given in almost every case of slow labor; the number of still-born children, I doubt not, was greatly increased by this pernicious practice. At the present day, I think, it is rare for the practitioner to carry portions of ergot about his person.

I advise the Student of Medicine to be provided with a sufficient quantity of secale cornutum for any case in which he is made aware of a constitutional tendency of the patient to faintness and flooding after delivery. I think that no woman, who is known to have a tendency to flood dangerously after the birth of the child, should be left without its conservative influences. To give ergot some three or ten minutes before the child is born, is certainly not to expose it to the least danger from the ergotism, for it is extremely rare to observe the therapeutical force of the remedy until from twenty to thirty minutes have elapsed after its exhibition: now, women who flood after delivery rarely do so within the first twenty minutes, and, as the power of the article extends to the vacant uterus, and is perhaps no less forceful there than in the gravid womb, a well-timed administration of the drug is almost invariably successful in obviating the tendency to hemorrhage. It is true that I have exhibited the secale in some instances at the very close of the labor for women whom I had known to flood dangerously before, and in whom no good effect was produced; but it is still quite true that, in the vast majority of instances, and they are very numerous, in which I have made use of this precaution, my patients have been preserved from the alarm, and the exhaustion, and probable danger to which I have deemed them exposed; so that, in fine, I have no conviction stronger than this, namely, that the late administration of ergot for hemorrhagic patients is salutary and needful.

I trust that no reader of this work will ever commit the imprudence of administering secale cornutum with the view to force a child through a too narrow pelvis. I have said already enough, perhaps, as to the necessity of ascertaining beforehand the amount of probable resistance to a successful ergotism, to guard him against so gross a malapraxis. I am painfully aware of several examples of fatal rupture of the womb brought on by the furious excitement of ergotism, generated in order to overcome the resistance of a contracted pelvis.

As to the influence of the ergot on the constitution of the female, I am entirely unaware of any poisonous power that it can exert when given in moderate doses. I have seen a few women affected with slight vomiting after its exhibition, but was unable clearly to trace the accident as an effect of the medicine.

It appears to me that its sole therapeutic force is exerted in stimulating the muscular activity of the uterus.

It is sometimes given for the purpose of procuring abortion; but for the most part, happily for humanity, in vain. There are to be met with inside of the professional pale, here and there, wretches who will not, like Shiphrah and Phua of old, consent to destroy the fruit of the womb. Those good women preserved the children of the Jews, notwithstanding the command of Pharaoh. The modern Christian assassins will for a small fee sometimes agree to put to death the child, whose wicked parents circumvent its death.

It is useful to exhibit ergot for the purpose of rousing the torpid muscular force of the uterus for the expulsion of hydatids, and of the dead ovum or mola; I have succeeded in this administration of it. It is highly useful in the hemorrhage of abortions, often provoking a speedier expulsion of the remains of the ovum, and, when that effect fails, succeeding in arresting the hemorrhagic molimen by its power of condensing the uterus, of which a philosophical rationale is found in its ability to diminish the hyperæmia of the uterine circulation. In the gravid womb, the vessels are everywhere surrounded by the muscular tissue of the organ. When those fibres act fully, they cannot but compress the veins and arteries, so that we might metaphorically say that every vessel is surrounded by an animal ligature consisting of muscular fibre, which will tie the bleeding vessel if it be allowed to do so, and it will always do so if we should allow it by taking away the ovum, the waters, the child, the secundine, the clot, or the tampon.

To show that ergot may be taken in large quantities without injury to the health of the patient, and at the same time without exciting in the least degree the contractility of the child-bearing organ, I shall lay before the reader the following case, that of Mrs. R., at the 82d page of the 2d edition of *Clinical Midwifery*, by Dr. Lee.

"[CASE 29.] Mrs. R. again became pregnant about the end of ecember, 1837. 'On the 17th January, the catamenia not having eared, she began taking secale cornutum for the purpose of pro- ing the expulsion of the ovum.' She began by taking twelve grains four times a day in infusion. This having produced no effect in six days, the dose was increased to fifteen grains four times a day. In six days more, this was increased to a scruple four times a day. In six days more, this was increased to twenty-five grains without any effect. The dose was then increased to half a drachm four times a day. Mrs. R. then left off ergot for one week. When she again resumed it, she took one-drachm doses four times a day for four days, and this having produced no effect whatever, she left off taking it altogether. Mrs. R. therefore took seven ounces of ergot of rye, which was all procured at Butler's, Covent Garden. Labor not having followed, I perforated the membranes," &c. &c.

CHAPTER XXII.

OF MILK-FEVER.

THE mammary glands, which in the virgin state are small and to a great degree undeveloped, participate in the new movements of the constitution that are established in the pregnant woman. The tissue of the glands begins early to expand, and the breasts become sensibly larger very soon after the conception takes place; the areola and nipple assume a darker hue, and indeed turn almost black in some persons. These changes do not take place without producing a sense of soreness or aching of the part. So great is the increase of vital force, that some women find a considerable secretion of milk in the breast, as early as the sixth, seventh, and eighth months; but, for the most part, no milk is formed so soon. If a healthy woman should miscarry at five months and a half, it is to be expected that her breast will fill with milk within seventy or eighty hours after her delivery, and, *à fortiori*, secretion may be expected if she be confined at the sixth month or later. I have seen a woman whose child was born at five months and a half, who served as a most excellent wet-nurse. I have found milk in the galactophorous tubes of a young woman, whose body was exhumed for examination by a jury, although she had been confined at a little past five months. During all this time, the organ, though more firm and protuberant than in the non-gravid state, does not become positively hard, but is soft and yielding under pressure; for the increased size is owing more to an increased deposit of adipose matter on the breast exterior to the fascia of the gland, than to the swelling, enlargement, or engorgement of the glandular tissue itself, at this early stage. Such are the phenomena relative to the breast in pregnancy.

Let us now endeavor to account for them, by a reference to the internal structure and uses of the apparatus which nature has arranged for the support of the new-born product of the gestation.

The breast appears at an early stage of the fœtal existence, but does not become prominent until the period when the girl is passing into the womanly state, and even then the substance of the gland is more solid and condensed than when prepared for the production of milk. The adipose structure is very abundant upon the breasts, so that, in general, fat women have them of great size, without at the same time having a larger share of the glandular material than some other women of a meagre constitution; and, indeed, it does not appear that the largest breast is to be depended upon for the production of the greatest quantity of milk. A breast of middling size is to be preferred in choosing a wet-nurse.

A layer of adipose matter is to be found immediately under the skin in dissecting the breast, and this adeps exists there in masses or lumps, separated from each other by cellular digitations, which unite the skin to the parts beneath it. Underneath the fatty layer are to be found the lactiferous glands enclosed in their true fascia. The whole gland is so formed as to resemble somewhat a placenta, being circular, thinner at the margin than at the centre, and consisting essentially in a great number of small grains, the size of millet-seeds, which are enclosed in separate packets or bunches by the cellular laminæ, which thus break it up into lobes or nodules, each, as it were, enclosed in a cellular fascia. The exterior surface of the whole gland is enclosed in a condensed cellular texture, which constitutes a fascia for it, but is far more ductile or distensible than the fascial coverings of some other parts of the body. The gland thus constructed is supplied with blood from the intercostals, the external mammary, and the internal mammary arteries. The nerves of the breast are also derived from the intercostals and from branches that proceed from the axillary plexus.

It has also an abundant supply of absorbents. The granules of the breast, or its acini, give out, each of them, a tube or lactiferous duct, which, uniting with others from the same bunch or packet of grains, at length form a lactiferous duct which proceeds towards the areola and nipple, so that each packet or nodule of acini sends its own excretory tube to the nipple, and has no connection with the circumjacent nodule. In the same manner the lobuli of the placenta send, each of them, its vessels towards the cord without communicating with the adjacent lobules.

The lactiferous ducts soon become, by the union of so many primitive excretory tubes, quite large; and they become the larger, the nearer they approach the areola and nipple, in which they contract or grow narrower, and each tube sends its own duct to the nipple, on the extremity of which it opens, in order to pour its fluid into the infant's mouth, when it is drawn forth by the suction.

It is stated by Haller, in his great work, and confirmed by other and later writers, that, in addition to the lactiferous tubes, which may be regarded as the efferent ducts of the acini and the packets, the galactophorous vessels are also composed of numerous excretory or efferent ducts which take their origin from the adipose cells, and convey thence a material that helps to make up the constitution of the milk. I do not know that this question has been settled by any of the minute anatomists in America or elsewhere.

The number of tubes opening on the extremity of the nipple amounts to fifteen or twenty, and each tube is lined, according to the opinion of Bichât, with a mucous membrane, since, he says, the orifices of all the glands are furnished with a mucous surface.

Such being the construction of the mammary gland, it follows that its nervous and vascular apparatus, having extensive communication with the rest of the system, must endow it with the faculty of awakening numerous and powerful sympathies in its diseased affections.

The woman who approaches the term of her gestation feels the breasts grow quite heavy; they are rather firmer in consistence, the areola becomes blacker and blacker, as she approaches her accouchement: after the child is born, she observes no change in them until the second, or more commonly the third day, so that, until forty-eight or seventy-two hours have elapsed, we have no reason to look for any fluxional movement in that direction. But about this time the breasts commence swelling, they ache, and suffer shooting pains throughout their substance: the swelling goes on until the skin of the mamma fairly shines with the tension; blue veins, that are very broad, are seen creeping in every direction over the superficies of the hemisphere, and even the nipple partakes of the engorgement. The breast is now painful to the touch, and each one stands out so firmly and so hard from the thorax, that the woman is often obliged to lie upon the back for more than an entire day, being unable to bring her arms together on account of the pain the breasts would suffer in their approximation.

In this state the breasts may be compared to two great phlegmons upon the most sensitive part of the body, and we need feel no surprise at finding such a state of the glands accompanied with rigors and fever, and even violent fever. Accordingly, it is very generally the fact that a woman does not get her milk without at the same time getting a fever with it, and this fever is called the milk-fever.

I have, however, not the least doubt that I have, on various occasions, observed the beginnings of a fever, which proved to be the milk-fever, and in which during many hours not the least appearance of increased engorgement, heat, or painfulness of the breast was discoverable; signs which, however, afterwards manifested themselves, and which, together with the usual termination of the fever in copious perspirations, after the usual course of nineteen or twenty hours, left no doubt upon my mind that the fever was milk-fever.

In a good moiety of the cases, this, like other kinds of ephemeral fever, is ushered in with rigors, headache, and pains in the back and limbs. These pains are often intense; but the true type of the fever is, that it is an ephemera, which declines, after a short and violent hot stage, that gives place to a copious sour perspiration.

If not before, then as soon as the milk-fever begins, the patient ought to take some aperient medicine, such as castor oil, salts, Seidlitz powders, or salts and magnesia: it is always cooling and calming for a feverish patient to have the bowels moved freely, and in this particular fever it is highly commendable to be watchful against any excess of violence in the febrile excitement. For my own part, when I find in a milk-fever that the pulses are strong and large and frequent, the calorific functions highly excited, and the head and back and limbs aching, I rarely fail to let blood from the arm. This is the surest and most prompt method of relieving the present distress, and by far the most certain means of obviating the dangers which accompany all fevers in a newly-delivered woman.

As I have said above, the nature of the fever is to be ephemeral; yet it but too often happens that this ephemera is converted into a long-continued fever or a remittent, during the course of which, various organs, and particularly the peritoneum and the womb, are excessively liable to be attacked.

To take eight or ten ounces of blood, then, and to give a smart purge, is a very safe and commendable proceeding in all cases of milk-fever that are a little severe.

I had, not long since, a young lady under my care in her first lying-in. The labor was very painful, and lasted about twenty-four hours. On the third day she had a rigor, heat, swelled and painful breasts, and a great quantity of milk. Instead of going off in eighteen hours, this fever lasted nine days, when there was a complete solutio morbi. I supposed her to be now well: but no—she was attacked next day with all the symptoms of endocarditis, from which she barely escaped with her life. As the endocarditis went down, it was followed by a couple of very large and painful swellings, one over each sacro-iliac junction, both of which seemed to be doomed inevitably to suppuration. During the existence of these swellings, she had constant hectic; but both of them were slowly and with difficulty discussed; after which, she regained her health most perfectly, having lost her milk. For several days the friends of this lady despaired of her cure, and she suffered the most distressing pains and weakness. Now I have related this case to show what may become of the most simple form of milk-fever, and the necessity of observing it, not so much on its own account, as on account of the conversions and depravations to which it is liable.

I think that one of the fruits of the statistical methods which have become fashionable of late years is the establishment of what, perhaps, might be properly called pathological Ontology. It seems to me that the tendency of modern writings is to make the Student and early practitioner believe that each disease is one and the same, saving the modifications that occur in *its* phases, from beginning to end. I presume, however, there are few practitioners who, from age and much clinical experience, have become familiar with the changes that take place in the diseased constitution, who are not aware of what has been called by a writer the "conversion of disease."

A disease may begin in the alimentary apparatus, and end as a disease of the respiratory apparatus; a curable disease of the brain may, during its existence, introduce modification of the health of the respiratory organs, which being curable, nevertheless, during its existence, brings about maladies affecting the kidneys, the spleen, the liver, or other noble parts of the body. It is difficult for me to conceive of a person dying of a single disease, for I firmly believe that life consists in the trinity of powers residing in the circulatory, oxygenating, and innervating organs; I am not surprised, therefore, to find a patient, who being seized with a rigor, the consequence of an overloaded or irritated mammary gland, is subsequently attacked with inflammation of the broad ligaments, uterine veins, or peritoneum, in consequence of the increased simple momentum of the blood, and modifications of the nervous force dependent upon the febrile condition. I need say nothing as to the changes in the crasis, or the mixt, of the blood itself, effected by the violent threshing force of the ventricles and the impetuous rush of that fluid through the arteries and capillaries of the body.

When, therefore, I find a lying-in woman with a synochus-fortis pulse, notwithstanding I regard a state of the mammary gland as the cause of the phenomenon, I tremble lest the force of the circulation uld overcome the feeble barriers which the physiological condition the fatigued and exhausted child-bearing organs offers against its lence.

I, therefore, make haste to reduce the violence of milk-fever within tenderness of the mammilla shall become less; the causes act and react mutually, and the inflammation, turning inwards upon the milk-tubes of the nipple, spreads, by continuous and contiguous sympathy, into one or more of the large canals, which are already over-distended, and, therefore, in a morbid state. The foundation for mammary abscess is very commonly laid in this train. For the most part, the excoriation occurs near the base of the nipple, in a fold or wrinkle of the skin which half encircles the part, and which, when placed in the child's mouth, is to the most exquisite degree painful. Tears are seen to roll down the cheeks of the patient every time she takes her nursling to the breast; and she comes at last to lose her spirits, and to grow moping and melancholy, to such a degree as greatly to retard her convalescence, or even to cause the attack of a fever of a serious nature.

There can be no surer proof of the difficulty of curing any disorder than that drawn from the vast variety of remedies for it. It is well known that the remedy for intermittent fever is the Peruvian bark, or its preparations—everybody is agreed on that point: so also mercury is a proper remedy for lues—which few persons doubt. But, as to sore nipples, the whole world seems to have been ransacked for *cures*, and in a thousand lying-in rooms we shall find a thousand different *cures*, which, after all, are not capable of curing the malady. For my own part, I do not believe in the cucumber ointment, so praised by Velpeau, nor the unguentum populeum, nor the lead-water, nor the castor oil, nor the borax and brandy of Sir Astley, nor the infusion of green tea, nor the slippery elm bark. I make it a point to examine the sore nipple for myself. If I find an excoriation or an ulcer seated upon a nipple actually turgid with inflammation, and highly sensitive to the touch, I advise some blood to be drawn by a circle of leeches set on the white part of the breast just beyond the areola. This leeching, followed by an emollient poultice of flaxseed mixed with crumbs of bread and milk, to cover the whole nipple and areola, is soon followed by a reduction of the inflammation. When that is subdued, the crack, fissure, or ulcer begins to heal very kindly under the gentle stimulation of a weak solution of nitrate of silver. But one might vainly try to cure the ulcer before the inflamed base on which it rests is cured. When the substance of the nipple is cured, the sore on the surface will heal for anything or for nothing. After the nipple in substance is relieved, the cucumber ointment, or a true pomade, made with scraped pippins stewed in prepared lard or any proper base of an ointment, causes the cure to be soon effected. As this

ointment is a very useful one in many occ
breast, I will not refrain from giving the Stu
for its preparation; and though I am no gre
salves, I shall not blush for having descend
as this. I beg leave to say that, as the oi
constantly stirred or moved with a woode
give it a granular character.

Take of — White wax two ounces
Deer's suet six ounces
Oil of almonds two ou
Scraped pippins four
Dried currants two ou
Alkanet one drachm.

Mix.— Melt in a water-bath, and simme
time; strain the hot liquid, and beat it in
make a proper ointment, stirring until the

In those cases where the pain is very
relief or palliation is to be found in touchi
lunar caustic, which, though it smarts for
followed by a diminution of the sensibility
touch only the excoriated part; if it act on
coriated, abrasions of the sound epithelium
ing enlargement of the sore.

In applying the nitrate of silver, one sho
camel's-hair pencil, which, being moistened
with a portion of solid nitrate, until the wat
taken up a sufficient quantity of the salt; w
cracks or fissures, being slightly stretched
touched on the granulations, so as to avoid
the caustic the tender margin of cicatrizatio
it; to take a coarse piece of solid nitrate i
whole day, which is a great evil.

The late Dr. Physick, whom I consulted i
excoriated nipple, taught me that I shoul
an incised wound or any ulcer—that is,
nearly as possible into contact. A bit of fi
the shopkeepers, was thinly spread with a
narrow strips of the plaster, several inche
prepared, were applied in a direction transve

so as completely to close the wound or ulcer; the strips were removed for the purpose of giving suck, and always replaced immediately afterwards. The method of the good surgeon was rapidly and completely successful, as I have found it to be on numerous other occasions since that time.

During the process of cure of sore nipples, very great comfort is obtained by causing the child to suck through the artificial nipple, made by covering a proper shield of pewter with the prepared teat of a heifer. Such artificial nipples are prepared in great perfection, and sold by the apothecaries in this city. They prevent the direct contact of the child's gums and tongue with the diseased organ, and thus allow the parts to heal with great celerity in some instances. It sometimes happens that the child refuses such a nipple; but in the great majority of cases the infant takes it well, and the pain and inflammation soon afterwards disappear. There is also a variety of shields or caps for covering the nipples, in order to prevent them from being pressed or rubbed by the dress of the patient.

When the breasts are filled with milk, their lactiferous tubes are liable to over-distension to such a degree as to excite in them an inflammatory action. They are also, in this state, liable to injury from the pressure of a tight dress, or from the use of a dress so loose as to allow the heavy organ to be suspended by its own tissues, which is painful and irritating to the last degree; or the breast is exceedingly liable to be injured by the mother lying upon it in her sleep, or by the child bruising it by bumping its head against it. Lastly, as I have already said, the irritation of a sore on the end of the nipple is readily propagated along the course of the milk-tubes into the substance of the breast, so as to produce there a more or less violent inflammation. Cold and damp air, to which the woman sometimes imprudently exposes the organ while in the act of suckling the child, especially if while in a state of perspiration, is a pretty frequent cause of the difficulty; and, indeed, there are to be met not a few females who possess what may with great propriety be called an irritable breast, and to such a degree that the slightest exciting cause, as cold, pressure, distension, or the like, establishes the inflammatory action at once. Some people are so plagued with frequent attacks of milk-fever or weed, that they are compelled to wean the child, in order to get rid of the milk and the irritability which it brings along with it. I know a lady who has had the breast so irritable that, whatever cause happened to excite a too active movement of the blood in the vessels,

would seem sufficient to establish so great an affluxion to the breast
to inflame it to her great distress, trouble, and disappointment.

The Student ought to be made to understand that, after enteri
upon the practice of medicine, he will very often be called on to gi
his opinion for nursing women, whom he will find complaining of hea
ache, pain in the back and limbs, with a very frequent, full, and ha
pulse; these symptoms having been ushered in with a chilly fit of c
or two hours' duration. He will rarely fail, under such circumstanc
to make at once a correct diagnosis, if he asks the question, whetl
there is pain in one of the mammary glands; and if answered in t
negative, let him not give up the inquiry, but let the gland be pres
betwixt the thumb and fingers. If there is any soreness there, it w
in this way be readily detected. A small lump is very likely to
found, as big as a nutmeg or larger, which alone is sufficient ca
and explanation of so much constitutional disturbance. The inflamm
tion and obstruction of a single galactophorous tube are sufficient
produce chill, fever, cephalalgia, and pains in the limbs, like those
break-bone fever.

Whenever this milk-fever, or fever arising from an irritated state
a part of the mammary gland, is very great, the patient ought to
bled. Eight or twelve ounces will mostly be enough for one operatic
a smart purgative should be afterwards given; the patient directed
put a poultice of milk and bread upon the painful part of the brea
and to keep her bed. It would be most unfortunate for her to refra
from suckling the child, which ought to go to the breast whenever it
found to fill up with its milk.

In the course of a few hours after the bleeding and the operation
the cathartic, fifty or sixty leeches should be applied near the painf
part, unless the local disorder should by that time be greatly reduc
in intensity.

These leechings are highly useful, and ought to be repeated daily
those cases which seem not to require or admit of the employment
the lancet, but which at the same time demand the local abstracti
of blood. In one patient here, I had a large number of leeches appli
to the breast; they were useful, but did not cure the pain and obstru
tion. The leeching was repeated seven times before the inflammati
gave way. In a subsequent confinement, they were applied nine tim
before they succeeded in relieving the distended, hardened, and painf
tissue of the breast.

It may be said, the mammary gland is suspended upon the skin i
front of the thorax: whenever it becomes heavy from engorgement c

from obstruction of its milk-tubes, it tends to fall downwards from its weight, and in doing so the natural relations of mutual tension of its integral parts are disturbed, I might say destroyed. To explain myself fully, I will say that the gland is dragged, pulled by its weight, and that the nerves and blood-vessels of supply are put uneasily and even pathogenically to the strain, just as happens to the testis in a hernia humoralis.

I should think no surgeon at the present day would treat a hernia humoralis without the aid of a suspensory bandage, and I am equally sure that no thoughtful practitioner would undertake to treat a violent case of mammary inflammation or mammary abscess without providing some proper means of suspending the organ, or of preventing its fall downwards; a fasciola or strophium of some sort should be resorted to in every such case; and I advise the Student to make use of a fasciola or strophium consisting of a strip of patent adhesive plaster, sixteen or eighteen inches long, and little more than an inch in width. Let one end of this adhesive strip be carried far back and high up under the axilla, and affixed to the skin there; then let the breast be raised up by the hand to its normal position, and while so supported, let the plaster be brought round underneath the hemisphere and carried upwards until the end applies itself as high as the opposite clavicle. One such strip will be in many cases found sufficient to cure even a violent inflammation of the mammary gland, just as a considerable orchitis is often cured by a suspensory bandage alone.

I exhort the Student of Medicine to make himself acquainted with the uses of the breast, to know the nature and sources of its circulation, innervation and absorption, as well as its secreting office, in order to prepare himself to combat fully the ills that menace those persons who confide to his skill and conscientiousness the preservation of their health in the lying-in room. It is difficult to form an opinion of the amount of poignant distress, depression of spirits, and actual loss of health attendant upon some of those cases of mammary abscess which, from beginning to end, occupy months, besides ruining the gland, to the great detriment of the patient in future confinements. A mammary abscess is a very serious matter, demanding a conscientious regard to the fulfilment of all the duties incumbent on the practitioner in the case, yet often treated with neglect and indifference.

Lying-in women are managed by their monthly nurses or friends, and it is very difficult for the physician to make either the patient or her attendant understand the true wants of these cases. I am very sure that a great proportion of the mammary abscesses that I have met with in my life have been the direct results of over-distension of the milk-tubes; nor can I well understand that one, or a dozen galactophorous tubes, as large as swan-quills, should be filled to their utmost capacity, for several hours, with milk, without determining in their mucous and fibrous structures such a hyperæmic and hyperneuric condition as to result in the establishment of inflammation of those tissues. But such inflammation passes through such tissues to the gangue of cellular tela by which they are invested; heat, swelling, pain, and redness of the parts follow upon such an engorgement, commonly in the course of a few minutes, or certainly in the course of a very few hours: a condition likely to be aggravated by the increased distension which a failure to draw off the milk, whether from ignorance or timidity, invariably produces.

I believe the Student cannot possibly become too vigilant and anxious to explore, and therefore to understand, the mischievous tendency of the engorgement now spoken of: he should give such directions as to emptying the breast, either by the aid of the nipple-tube, the breast-pump, or other method, as may save his patient from the distress of a developing mammary abscess.

A mammary abscess for a lying-in woman is a great misfortune; it almost deserves to be called a catastrophe; and for a woman, indeed, who has a bad constitution, or who is affected with a strumous habit, or is at all prone to tuberculosis, a mammary abscess is a circumstance replete with alarm and danger. If the suppuration be very deep-seated, it sometimes happens that many days, or even weeks, are passed before the matter of the abscess makes its way to the surface. In the mean time, a constant fever, exhausting perspirations, and a state of the constitution that can only be truly characterized as hectical, attends the painful and reluctant progress of the suppuration outwards. But, suppuration, when it takes place, often attacks several of the different loculi in which the independent packets and bundles of the milk-tubes, and granules of the gland, exist; so that a woman is affected with an abscess which is really multilocular in its nature, and which, when evacuated, allows the cavity to be converted into winding and many-celled sinuses, difficult to cure and often lasting for weeks and months. I need not allude to the exhaustion, the pain, the hectical fever, and the wasting discharges of suppuration. I repeat that it is almost a catastrophe for a lying-in woman to be attacked with a mammary abscess, and particularly if regard be paid to the great domestic vexations often produced by it. The young child is often the victim of such an accident, and the whole household is sometimes kept in a state of disquietude for an entire year, by the dissatisfaction engendered from the necessity of frequently changing the wet-nurse, who is brought in to relieve the woman herself, or to preserve the child from the dangerous risks connected with its artificial• alimentation.

An abscess is a circumscribed cavity containing pus. One of the chief causes of the pain of it is the tension, and it is desirable that the character of the abscess should be abolished, as soon as it may be done conformably with the interests of the patient. As soon as the abscess is opened by the bistoury, or by the natural process of absorption, it ceases to be an abscess and becomes a deep-seated ulcer; the tension and pressure are, thenceforth, either greatly lessened or wholly removed. In the treatment of mammary abscess, however, it appears to me not desirable, in general, to draw off the matter from a great depth below the tissues, because, in doing so, the fistula, through which the matter escapes, and which is made by the lancet, is almost sure to become sinuous, and convert the abscess into a fistulous ulcer. Hence, I should deem it advisable, in the conduct of such cases, to wait rather longer than in some other abscesses for the rising of the pus to a point near enough to the surface to obviate this risk.

During the progress of the suppuration, great comfort is obtained, first, from supporting the gland by means of an adhesive fasciola, or strophium; and, secondly, from dressing it with emollient poultices. I think that poultices are more useful if they contain the petals of chamomile, or hops, or crushed onions; for the use of these agents, as it appears to me, serves to prevent the formation of those eczematous blotches and patches which are apt to follow the simple poultice of bread and milk, of flaxseed, of slippery elm, or other emollients. I do not think that anything can be more suitable for the treatment of this part of the case than the poultice composed of equal parts of slippery elm flour, flaxseed meal, or crumbs of bread and chamomile petals. As soon as the breast is opened, whether spontaneously or by the surgeon, poultices may be abandoned, and a practice introduced of compressing the breast against the arch of the ribs by long narrow strips of adhesive plaster, which cross it in various directions, take firm hold on the thorax to compress it, and hold it still. The effect of the compression is to counteract the development force of the still remaining uncured inflammation of the tissues.

There is no antiphlogistic that can compare with the power of mechanical compression for cases in which it is possible to adjust it; and it is possible to adjust it for the female breast. Every day, during the treatment, and indeed several times a day, a delicate cereole, made of cere-cloth, should be introduced into the opening, and conducted to the bottom of the tube or sac. If the cereole be not disproportionately large, it gives no pain, and its withdrawal is followed by gushes of pus or sanies, whose detention in the bottom of the tube or sac reconverts the malady, restoring it to the nature of an abscess, for an abscess is a circumscribed cavity filled with pus.

It appears to me that, managed in this way, there will be found few samples of gathered breast obstinately to resist the treatment.

In many instances where the suppuration makes its way to the surface, within or near to the margin of the areola, milk is found to escape along with the pus, and a troublesome milk-fistula is generated by it; sometimes these fistulas of milk continue to flow for a great many weeks, accompanied with a very small quantity of purulent matter, and a portion of sero-pus or sanies. To shut up the orifice with adhesive plaster is to re-form the abscess, since it reproduces a circumscribed cavity, and the abscess opens again and again—a cause of great vexation. I have found them, I think always, yield upon the daily introduction of a delicate cereole, made of cere-cloth, which should be carried to the bottom of the cavity, and withdrawn from time to time to allow of the escape of the contained fluids, but to be replaced immediately afterwards. It generally happens very soon that the cereole goes less and less deep into the tube, which, filling up with granulations from the bottom, at length precludes the possibility as well as the necessity of its introduction—for the fistula is cured.

In the winter of 1840, I attended a lady confined with her first child. She was so extremely modest that, several days after the birth of the infant, being seized with inflammation of part of the gland of the left breast, she would not allow the nurse to inform me of the accident, lest I should wish to examine the part. In this way, she continued to bear the pain for several days, until it became so great that my attention was called to it. I advised the use of leeches. Compliance with this order was deferred for two or three days, and when at last yielded it was too late to do any good. The breast suppurated near the posterior surface, almost down on the fascia; the pus was long making its way to the surface, which it did at length, and was evacuated by an incision. The case altogether was rendered a most embarrassing one by the timidity and nervousness of the patient, who became so very ill as to excite in me the most painful solicitude. I was for many days anxious on account of a very wearying short cough, for which I could discover no explanation upon a most careful auscultation of the thorax. The pulse was always above one hundred and ten. Upon going to see her one morning, I found her with the most singular respiration and pulse that I had ever seen connected with any exterior disorder of the breast. Her pulse was not less than one hundred and sixty beats a minute, and the respiration was more than one hundred times a minute. Her hands were covered with moisture, and, from her emaciation, I felt the greatest inquietude upon finding so strange a state of her circulation and respiration, which, she told me, had come on shortly before, having been of the same character once or twice some hours previously to my visit.

After looking upon this strange scene for a minute or two, and after repeating the auscultation, I begged permission to examine the breast, which had been more painful. I found a new abscess pointing up under the skin. As soon as I opened it, and with a bistoury cut up a bridge of skin which strongly bound two other orifices, her strange respiration instantly gave place to a very calm and deliberate one, while her pulse also recovered a far more natural rate. This lady, having lost all her milk, took in a wet-nurse, and after some time recovered a very perfect health, after the most distressing and protracted illness brought on by a simple, but neglected, inflammation of the lactiferous gland.

In the second volume of *Bright's Medical Reports*, p. 459, there is related a case of what he calls hysteric dyspnœa.

"I was passing," says he, "through the wards of George's Hospital one day during last winter, when one of the surgeons requested me to look at a female patient who had a formidable disease of the mamma. She had been seized with alarming dyspnœa: her respiration was performed with most unusual effort, but it was not so much hurried as laborious; and she complained of a constriction across the chest, which was altogether unconquerable. Pulse very quick. It had been believed by some that she suffered an attack of pneumonia; but there was no cough, and the breathing was rather with effort than with pain or difficulty. Her feet were quite cold; her pulse weak. She was in a state which might have resulted from sudden effusion into the chest, or the bursting of an aneurism. This was hysteria, and assafetida was its cure."

I wish the Student to compare Bright's case with mine given above; the slowness of the respiration in his with the frightful acceleration in mine, and all coexistent with formidable disease of the mamma; and then observe that my patient was instantly and completely relieved by the bistoury, while Bright's was cured by assafetida. I should think he would come to the conclusion that neither of the cases was really to be arranged among the hysterical disorders, but was the result of irritation of a gland, having so large a supply of nerves from within the thorax itself.

It is highly advisable to wean the child, when sufficient time has been allowed to ascertain the probable long duration and great severity of a mammary abscess. This ought not to be done too early, because the suction of the breast by the child is a great and curative resource in the management of the disorder: when the inflammation confines itself to only a part of the breast, the other portions of the gland continue to furnish a good abundance of milk, and that milk ought to be regularly taken away, lest its accumulation should add to the difficulty already too great within the inflamed packets, or even invite the inflammation into the still healthy structures.

For *counter-sunk nipple* and *inverted nipple*, I refer the Student to my letter on the Breast, in my work on *Woman, her Diseases, &c.*, p. 678. To the same letter I beg leave to direct his attention for a fuller statement of this subject than I find occasion to present in the present volume.

I shall close this article, by advising every Student who intends to practise Midwifery, to dissect the breast for himself, after having most carefully studied "*The Anatomy of the Breast*, by Sir Astley Paston Cooper. London, 1840, 4to., with a vol. of Plates." This work is really a legacy to those whom, in his dedication, he calls "My dear brethren." It is prepared with an elegance, and liberality, and profuseness of illustration worthy of that great surgeon. The republication of it in the United States, in a style fully equal to that of the London edition, has conferred a benefit not only to the profession, but to thousands of suffering females, whose disorders of the breast would be more fully understood, as soon as that work should find its way, as assuredly it would, through the country.

PART IV.

THE HISTORY AND DISEASES OF THE YOUNG CHILD.

CHAPTER XXIII.

THE child in utero, as has already been stated, requires for its complete development a lapse of nine months, or two hundred and eighty days, less or more. It becomes viable at seven months.

Some children have lived that have been born much earlier than this; yet it is true to say that viability is attained at the seventh month.

The viability of the fœtus depends upon the evolution and perfecting of its organs to such an extent as to enable it to live a respiratory life. This it could not do until its lungs should be sufficiently evolved to enable the air-cells to receive the atmospheric air, while they should become fitted also to make the transfer of oxygen to the blood and of carbon to the expired air. If a child should be expelled while its air-cells were still undeveloped, it would necessarily perish immediately from atelectasis; new-born children expelled shortly before their time die, not because they have a complete but because they have a partial atelectasis pulmonum.

The heart of a child, in the earlier of its embryonal periods, is a straight tube; it soon becomes tortuous, and afterwards makes two cavities, which are one auricle and one ventricle. The progress of the uterine life brings the fœtus daily nearer and nearer to the condition of the breathing mammal; but it does not attain this condition, as a general rule, until the seventh month of gestation. If the child should be driven into the world before the completion of the organisation of its heart, it could not be deemed viable or liveable, because it could not successfully carry on the work of oxygenating its brain and nervous mass.

The septum ventriculorum of the fœtus in utero is early completed: if the septum auricularum should be also completed before the period of its birth, the child would necessarily be born dead, because there is no route by which the oxygenated blood of its placenta could be submitted to the action of the systemic ventricle, save that by which it traverses the right auricle and the foramen ovale, passing into the systemic ventricle, and that which it performs when driven by the right ventricle into the aorta through its ductus arteriosus. The black blood of its ductus arteriosus enters the aorta below the giving off of the carotids and subclavians: that blood can by no means reach the brain, but goes into the tissues below, where it gives up its oxygen or returns to the placenta to take an additional charge: therefore, none of the oxygeniferous blood of the child can reach the brain, save that which comes into its systemic ventricle through the foramen ovale and the left auricle. A child, therefore, whose foramen ovale should be completely closed—to suppose the case—would necessarily perish in utero with asphyxia, for asphyxia is black blood in the brain; nothing else is asphyxia.

The neonatus, therefore, is necessarily born with an open foramen ovale; but the foramen ovale is covered by a valve on the left surface of the septum: this valve serves after its birth as an operculum or lid to shut the passage. It is probable that the first inspiration of atmospheric air, coinciding with the descent of the diaphragm and the expansion of the thorax in every direction, serves to carry off to the lungs, through the pulmonary artery, a great efflux of blood, which, antecedent to that first act of respiration, chiefly but not wholly flowed off through the ductus arteriosus. The constantly augmenting facilities of this pulmonary circulation soon set aside any further necessity for the transitive agent—the ductus arteriosus—whose deserted channel soon becomes a ligamentous band.

The increased amount of blood thus determined to the lungs must have the effect of throwing a greatly augmented quantity of fluid upon the right ventricle; not to say that the right side of the heart carries on a greater circulation after birth than before birth; but the right ventricle cannot but carry on a much greater amount now, because it carries on the whole, whereas, before birth it carried on only a moiety of it.

The escape of the blood from the right ventricle into the pulmonary artery is probably effected with a facility greater than was that of its propulsion into the aorta through the ductus arteriosus; and I can imagine that now, the pressure of the two symmetrical parts of the heart being equalized, the valve of Botalli, instead of floating upwards into the left auricle, is by this equalization of the pressure shut down as the operculum of the foramen ovale; so that, although the child is necessarily born with an open foramen ovale, the equalization of force in the two ventricles serves to close it immediately after the first act of aspiration. The Student need, therefore, suffer no disquieting doubts or uncertainty in regard to the openness of the foramen ovale in the healthy neonatus at term.

In the non-viable child, previous to the seventh month, the valve of Botalli is incomplete and has not a perfect operculum; it cannot thoroughly cover the orifice of the foramen ovale. If the child, therefore, be born without a complete valve, it will probably die from asphyxia, from the mixture of its black and red currents in the systemic ventricle; a child, therefore, whose heart is incomplete is non-viable. Some children born at term appear not to have conformably developed this valve.

A child is rendered non-viable, in consequence of many other faults of development. The astomatous child is non-viable, as is that in which the œsophagus has failed in part of its development, rendering the cavity of the stomach inaccessible to aliment. The anencephalous child is non-viable, since important parts of its organization are wholly wanting; the acephalous fœtus dies of course. The child is non-viable in which ectopy of important organs, as for example ectopy of the liver and the whole alimentary canal into the root of the umbilical cord, exists; for the cord, being deciduous, must fall off in the course of a few days, leaving the vital organs exposed to inevitable ruin. The child is non-viable in whom large portions of the rectum fail to be developed, although a few examples are met with in which the surgeon, by a dexterous operation, has saved the life of the child laboring under imperforate rectum; probably those that have been thus saved have failed to produce merely a short tractus of that intestine.

Many children perish in the womb from disorders affecting important parts. Doubtless in the early stages of embryonal life, very slight derangements in the structure of the omphalo-mesenteric vessels, or of the duct of the umbilical vesicle, might and do determine the death of the new being. Children also perish in the womb from diseases affecting parts within the cranium, for the child lives by its nervous mass as truly as the breathing animal does. Diseases of the kidney, and liver, and alimentary apparatus prove the not unfrequent causes of the death of the child in the womb.

Various affections of the mother produce the death of the child;

passions of the mind and physical distempers, to which she is subject, bring it into danger, or destroy its tender existence. Various diseases affecting its umbilical cord; modifications of its placenta, whether as to insufficient magnitude of that organ, or modifications induced by the deposit of calcareous carbonates upon the uterine surface of the placenta; or the establishment within it of the disease called *hydatid degeneration* of the organ; or partial detachment of the placenta, serve to destroy the young child before it is born.

The child, when it is driven into the world, is sometimes found unable at once to establish its respiratory life; it lies still and pale, being perfectly motionless; there is little tension of its muscles; if handled, it appears to be flaccid, or, to use a common phrase, limber, like a person who has fainted. If the cord be taken between the finger and thumb, nigh to the navel, the Student will be able to judge whether or not the heart is beating. If the heart is beating, the pulsations will be felt by the finger and thumb by compressing the cord, in which are the two umbilical arteries. If the pulsations are vigorous, and repeated at the rate of about one hundred and forty pulses per minute, no alarm need be felt as to the security of the infant. In a few moments, the diaphragm will receive its nerve-stream; it will descend, compelling the air to enter the lungs, whose embryonal atelectasis is instantly removed by the expansion of the air cells; the oxygen of the atmospheric air, combining with the blood of the pulmonary circulation, will hasten to the systemic ventricle, which, injecting it into the brain, extricates there a flash of vital force, that irradiates with instant life every nerve fibril in the constitution. This new and powerful infusion of vital force is made manifest by struggles, by cries, by rapid coloration of the surface, and by all the signs that indicate an established respiratory existence. Sometimes the child scarcely cries, or utters a low whining sound. If carefully observed, it will be found to take very short and feeble inspirations. It has not yet had strength of diaphragm to open in full all its air-cells. If the Student should in such a case cause it to cry aloud, by dashing cold water on its breast and face, he might expect a full and powerful act of the diaphragm to open every air-tube and cell of the now perfected lung.

As soon as the child is found fully to have established its respiration, steps should be taken to sever it and remove it from the mother's couch. As before directed, a ligature should be put upon the umbilical cord, at the distance of an inch and a half or two inches from the navel. Tying of the cord is not an indifferent matter, and it is necessary to examine the ligature that may be presented for the purpose before employing it, and it should be strongly jerked between the two hands, in order to test its strength. It ought not to be less than ten or twelve inches in length; a portion of ligature four or five inches long cannot be firmly held, for it becomes slippery in the moistened hands. If it be not of sufficient strength, it may, in tying the first or second knot, give way, and allow the two hands to separate with violence, which exposes the accoucheur to the risk of tearing the cord out at its root. When the cord is passed around the umbilicus, it should not be tied without taking the greatest care to avoid this sudden separation of the hands that are employed to tie it, upon the possible breaking of the ligature. The cord should be ten or twelve inches long, as I have said, so that, being held in the hands and the knot arranged, it can be fastened by separating the radial edges of the hands, rolling them both outwards in supination, without a direct steady pull. I never think to tie an umbilical cord in any other manner than this, and more particularly as my early experience placed me repeatedly in danger of destroying the child, by suddenly jerking its navel-string, from the breaking of improper ligatures placed in my hands.

In applying the ligature to the umbilical cord, one may be employed or two. If it should be a twin pregnancy, there surely ought to be two ligatures, lest, if there be a common placenta, the second child should suffer a dangerous loss of blood, from the untied end of the cord. In those cases in which the placenta is known to be detached, and pushed into the os uteri, it is better to have only one ligature, for, in that case, the blood of the placenta is discharged in considerable quantities from the cut extremity of the cord, thus serving to diminish the magnitude of the placental mass very considerably, and enabling the woman to thrust it forth with less effort and less pain than would be otherwise required.

On the other hand, if, before proceeding to the severance of the child, the uterus is found to be still very large, in consequence of containing the placenta in its cavity, it is better to apply a second ligature; by doing this, the Student would restrain the evacuation of the placental blood, and thereby keep the organ fuller, more plump and solid, which would enable the uterus more readily to slip it off from the utero-placental superficies than it could do if the placenta, by the evacuation of all its blood, should become flaccid, like a wet, soft sponge.

The child, being removed, should be washed and afterwards dressed. It should be washed in tepid water at all seasons of the year. The body of the new-born child is usually covered with a flaky, unctuous matter, or induitus, that is insoluble in water, and is not removable by means of soap; it readily incorporates, however, with oil or lard, or the yelks of eggs. One or two yelks of eggs, beaten up and rubbed over the whole surface of the child, suffice to make an emulsion with the white induitus of the child, which is afterwards readily washed away by means of soap and water; or the whole child should be carefully and thoroughly anointed with a handful of lard, which also incorporates readily with the viscous matter in question, and which is readily washed off afterwards. If the attending nurse is inexperienced, the Student should direct her to use, not a piece of linen or muslin, but a portion of soft flannel, as the wash-rag for the purpose of cleansing the child's body: either linen or muslin slides over the surface and fails to pick up every portion of the induitus, whereas every particle of it is taken up by means of a wash-rag made of the bit of flannel.

In cold weather, the child should be washed in a warm room, and sufficiently near to the fire; but its surface burns readily; let the Student take heed, therefore, that its body is not exposed to be blistered, as I have seen it blistered, by being held too near an open fire or grate.

As soon as the child is thoroughly washed, a piece of linen, four inches wide and eight inches long, should be doubled to make a square disk; in the centre of this disk, a slit should be made with a pair of scissors—it is best not to cut a round hole in it. Through this slit let the remnant of the navel-string be passed, so as to let the double disk of linen lie upon the belly of the infant; the cord should be laid down flat upon this disk, pointing upwards towards the scrobicle: the linen should next be turned up so as to cover it, the right side of the piece should be turned over the cord towards the left, and the left side of the piece should be turned over covering the right, which will effectually envelop the navel-string, which is all the dressing it can require. The object of this dressing is to receive the discharges which exude from the navel-string, and prevent the cord from adhering to the child's dress, to which, without some such precaution, it would soon become glued, and thus be liable to be torn off earlier than the period at which the natural process would otherwise detach it; there is no other use in dressing the navel-string of which I am aware.

As soon as the cord is thus dressed, the belly-band, which is usually made of a strip of flannel four or five inches in width, should be put over it, and the end, carried around the body, may be pinned either at the back of the child or at the side. After this, the child should have a shirt large enough to come down nearly to the hips. If it is too long, it will be constantly wetted with the urinary discharges. Next comes the petticoat, which is usually, in this country, made of flannel, and which has or has not, according to the taste of the mother, a shoulder strap, but which always has a proper waistband. Some persons do not employ the petticoat, but a good many women still use here the barracoat from the Portuguese, *barra*, an ell of cloth. It is a yard of flannel, more or less, of which one end is fastened around the waist, and the other brought up and pinned in front, so as effectually to cover up the lower extremities of the child—a convenient and facile mode of dressing it in cold weather.

The last covering is the frock. I should hardly deem it necessary to mention it here, were it not, in the first place, that I am writing for Students, who ought not to go to the lying-in room without being provided with some information upon particulars which, though they be of minor importance, are not without their influence upon the comfort and safety of his patient and upon his own success and reputation. But, more than this, I mention it, because I desire here to enter my solemn protest against the folly, the stupidity, and I might say the iniquity of the fashion which induces so many persons, possessing in other respects good sense and good education, to dress their new-born children less wisely than an Osage Indian mother, or the most savage Esquimaux. A child that is born does not surely belong to its parents until it has attained its sixth year; it seems to me that such a child is but a loan, on condition of becoming property, provided it be wisely and safely conducted up to the sixth year of its age, for one-half of the annual product of child-birth perishes in six years. It cannot be that this amazing mortality is an inevitable concomitant of the state of existence, but it must be a result of ignorance and carelessness as to the hygienical conduct of the neonatus and the young child. It is true that a multitude of children are brought into the world endowed with such a feebleness of constitution, or such hereditary depravation of it, as to render protracted existence and maturity impossible; but the population abstracts would find an immense augmentation were a sound discretion to preside over the hygienical management of newly-born children. Now in the United States, from Carolina to Maine, and from the Atlantic board to the western limits of Missouri, Iowa, and Wisconsin, little children are dressed in frocks without sleeves, or having only pretended sleeves, which are really nothing more than shoulder-straps, and that while the backs and bosoms also expose nearly the whole of the thorax. There would be no objection to such habits for children born between the 10th of June and the autumnal equinox; it would even be advisable so to dress the summer children, in a climate notorious for its intense light and heat; but to dress children in the same manner, whether born in June or February, is an imprudence which no power but that of Fashion could compel sensible women to commit. But Fashion has a power that often transcends the dictates of wisdom and of common sense.

I wish that in this volume the Student should learn that, although I have invariably, for a long series of years, combated, as far as in me lay, this vicious custom, I have found a few sensible mothers who would listen to and obey my injunctions, but I have found a vast number of children to suffer, and a multitude to perish, from their disregard of the dictates of common sense. I beg the Student, therefore, to take this matter into his serious consideration, and satisfy his own judgment upon the question, whether a child is safe, the whole of whose tender extremities are exposed to temperatures approaching to and sometimes lower than the freezing point.

The arms of a child are supplied with blood mainly by the delicate tube of the humeral artery. Much of the blood returns in the superficial veins; and great masses of it, either upon the skin or in the fingers, to resist the constringing effects of cold, require a power of the circulation probably amounting to what might almost be called pathological reaction. The superficies of the body covering the lungs is also often chilled, for the infant, "mewling and puling in the mother's arms," always has the whole front of its chest wet with the excretions of its mouth: such a condition can scarcely fail to expose it to attacks of pulmonary catarrh, of tracheal and bronchial inflammations, and coryza.

One of the causes most destructive to health is cold, especially damp cold; and the new-born child ought to be carefully protected against it by dresses, covering its chest up to the throat, and its arms down to the wrists, and its legs and feet.

I believe that in Europe, where the people by long residence have been compelled to learn the nature of their climate, one would scarcely meet with a child, from the royal infant to that of the beggar, that would not be found better protected against weatherly influences than the children of the United States mothers.

The pretext for this improvident exposure of the neonatus is, that it should be early hardened; but I submit to the intelligent Student the question, whether the surest way to harden a child is not that way which shall conduct it through the first six years of its existence without fever, inflammation, or other disease. If a child be properly covered up, and daily exposed to the sunlight in the open air, it will have the best chance of acquiring what is called a hardened constitution: there is little hope that a delicate child, otherwise cared for, shall pass to the end of the first month of its life without some degree of coryza, some pulmonary rhonchus, or some reactive effort of its vascular system, struggling against the constringing effects of cold damp, from which it cannot be protected except in overheated apartments, which themselves are almost as much to be deprecated.

If a child, protected like a sailor on an Arctic voyage, or like the rudest workman, should be daily sent *sub dio*, to breathe the stimulating and exhilarating air of the streets or country, and if its diet should be properly regulated, there are few diseases to which it would be liable, save those essential maladies which, to use the language of Willis, "*homini omni, soli et semel contigit affici;*" I mean measles, smallpox, scarlet fever, whooping-cough, &c., for I am very sure that the catarrhs, the pseudo-membranous croups, the bowel-complaints, and many even of the cases of tubercular meningitis, are the results of management scarcely wiser than that bestowed upon the child of the Ottawa, or the Shoshonee.

With these observations on the dress of the child, I shall dismiss the subject, after proffering one more remark; which is, that the people of the United States seem all to be hurried onward by the universally pervading desire to do what is here called Go-ahead; they are notoriously regardless of the care of their health, and this is attributable, perhaps, to the state of a people, who have but yesterday, as it were, conquered their lands from the swamps and the forest, and have been too busy with progress to attend to the minor concerns of the *savoir vivre.* I hope that no distant generation will be left to discover some portion of the agreeable to mix with the overflowing cup of the useful in the United States. In that case, the mortality reports will be less redundant with the infant proportion, and the whole female American race will present a spectacle very different from that which we now behold, since it is rare to meet with an American wife, the mother of three children, not already broken and ruined in health, by her servitude to the laws of fashion and the raging spirit of progress and *go-ahead.*

Let us now turn our attention to the alimentation of the child. It might be enough to say, for the information of any man of sense, that this is a generical process, for the child was made for the breast and the breast was made for the child, and nothing else, in this line, was made for either; therefore, when the child is fed otherwise than at the breast, it is fed by a succedaneum; every succedaneum is, by comparison, infinitely inferior in value and adaptiveness to the generical food which the Author of Nature supplied for it, and so constructed its organs and parts as to fit them to receive it and be developed by it. I shall not take the trouble, in this volume, to repeat the analyses and the observations upon milk which I have already printed in another work, nor indeed does it require any argument to show that, inasmuch as the proportion of oil, casein, albumen, and water in the milk of the different mammiferous creatures varies according to their genus, so the young of each genus is adapted to the reception of the sort of aliment devoted to its generical nature.

It is true that a young child who has lost its mother must be fed, and it is better for it to be fed with cow's milk or goat's milk than not at all; but I hold it to be a sacred duty for all those persons whose circumstances admit of it, to provide the new-born child with the milk of a human nurse, and not to expose it to the hazards—I should say the dangerous risks—of distressing illness and impending death, that threaten the great majority of those children that are brought up on the spoon or *biberon*.

The neonatus comes into the world full of instinctive desires; it will take food soon after its birth, and will satisfy its instinctive cravings to absolute satiety. But I beg the Student to remark that, while the Divine Author of Nature has ordained that children shall be born, he has also ordained that the plenary abundance of their food shall not, as a general rule, be provided for them until the third day after birth. It is not necessary, therefore, to feed the child as soon as it is washed and dressed; I look upon it as a direct flying in the face of Providence, as acting in direct contravention to the law of nature, which is but the command of God, to fill the stomach of the new-born infant with mixtures of saccharine matter, of gruel, or of the milk of quadrupeds: surely, He who made it knows better its true wants than those who, doubting his wisdom and foresight, make haste to test its digestive powers by these detestable mixtures, instead of waiting the fulness of his own time.

I have warned the Student, however, that hereafter he will encounter much trouble and vexation in consequence of the early and improper feeding of the infants under his care, and I exhort him by careful consideration to inform his mind as to the medical duty in such cases. He will never err, he will never go astray as a physician, who ascertains clearly the physiological laws of the function or functions placed under his surveillance; and he who in his hygienical ordinances is the best expositor of nature's laws, will be the safest and most successful physician; and it is certain that no human sagacity or skill can ever equal the perfection of those operations that are instituted and effected in accordance with the generical nature of the subject of them.

It is a mistake, and it is a grave mistake, to suppose that the neonatus is in danger of starvation because it is kept until the third day by the supply furnished it from the mother's breast alone; for there is always, after the birth of the child, to be found some small quantity of mammary secretion, which, though it be not properly deserving to be called milk, yet it is possessed in a measure of the properties of that fluid.

The earliest secretions of the milk gland are loaded with a vast abundance of colostrum grains, which are to be seen thickly strewn over the field of the microscope, mixed with vesicles and oil-globules, floating in the serum lactis. Probably the imbibition of this colostrum by the child has some economical relation to its conservation. The colostrum disappears in the course of a fortnight, or at most in three weeks, after the child's birth; I cannot imagine that it is a mere excremental matter, for the breast is not an excrementitial, it is a recrementitial organ, and all that it produces is designed for the advantage of the new-born child.

With these views I am quite clear in advising the Student to direct his patient to take the nursling to the breast at the earliest convenient moment. I have many times seen a child drawing vigorously at the breast within a quarter of an hour after its birth, and I believe to take the child to the breast is the most natural thing for the mother to do. To illustrate this opinion, let me invite the Student to consider the circumstances that might have attended the apparition of the first-born of mankind. The common mother of mankind had perceived the strange sensations and modifications of her form, dependent upon an advanced stage of her first gestation. She resided, perhaps, in some warm sunny valley of the Caucasus, bounded by an amphitheatre of lofty mountains, and enriched with a varied landscape, tinted with every hue and form of tree and flower and grassy mead. A transparent fountain arose, perhaps, near the bower, in which Adam had left her sleeping at the uprising of the morning. He may have climbed some lofty, distant cliff to gather for his bride its Alpine blossoms, or return, loaded with fruits for the object of his tender care. In the mean time, she is seized with the pangs of the first human travail—the terrible fulfilment of the curse on her early disobedience; alone, unaided, in a purely natural state; with that inherent health and strength which we may conceive of as appertaining to a creature which had issued perfect from the hands of its Maker, she advances through the unknown conflict, and, at the moment of its consummation, becomes insensible from the keenness of her anguish. In a few moments she is recalled to her senses by the voice of the new-born child; and, raising her languid head and inclining her bending body feebly supported upon the elbow, she perceives the helpless child of her bosom lying upon the grassy floor of the bower near her. It is not necessary to paint, indeed, it is impossible to imagine, the intenseness of the parental emotions which must have now agitated her bosom; these, instinct alone, would prompt her to put forth her hands and lift her first-born from the earth on which it lay weltering. She would take it up in her hands, her fore-arms were fashioned that they might be its cradle, its face would fall against her bosom, and it is probable that but a few moments elapsed after the birth of the first-born, until his mother experienced the sensations which only a mother can know, who pours the rich nutritious stream of life out of her own breast for the sustentation and comfort of her new-born offspring. It is perfectly natural, I repeat, that a mother should take the child to the breast at the earliest possible period after its birth. Every human direction and counsel in contravention of this most evident law of nature must be erroneous, save when it is founded upon views relative to the actual state of the mother or child, as setting aside, for the moment, the operation of those natural laws.

Some information should be given to the inexperienced mother or nurse in regard to the alimentation of the neonatus. I believe that pure instinct is more unerring than reason, and a better guide in all those cases in which instinct is designed to preside. I therefore look upon it as a tyrannical thing on the part of any physician to prescribe precise intervals between the applications of the child to the breast. I have no idea that any physician can be competent to decide upon the degree of activity of the digestive powers of any young child. The principles of conduct here, are principles to be derived from a knowledge of the wants of the child: a child may want the breast again in two hours, or it may not want it again in six hours. It is therefore preposterous on the part of the physician to say, as I have heard him say, that the child must be applied to the breast every three hours, or every four hours, according to his unerring wisdom. I advise the Student to direct the child to be fed when it is hungry, and allow it to be governed, as to the quantity it takes, by its instinct, which is superior in this matter to his reason.

It is probable that the child within the month, whose stomach can scarcely be supposed to hold, when perfectly satiated, more than three or four fluidounces of milk, will be able to digest and discharge the major part of this quantity into the duodenum, in the course of some three hours after its assumption; but it is probable that the feeling of hunger will begin to return long before the organ becomes completely empty. There are but few new-born infants that are incapable of rejecting a part of the ingested milk; the stomach in this way relieves itself of any excess, which the appetite might induce it to swallow. I have no doubt that a considerable portion of the ingested milk passes as milk and not as chyme through the pylorus. These considerations, together with observation of the facts, have induced me, in general, to say that the child might be applied to the breast about once in three hours; but I am far from prescribing three hour intervals as an absolute rule of conduct, and I have no objection to see the child again applied to the breast within two hours after having thoroughly satiated its desire for food, for I repeat, I rely upon its instinct, which was provided for it before the invention of Physic and Surgery.

The dental formula of animals is the index to their nature, especially to the nature of their alimentation. The state of its mouth is sufficient to make it apparent that the child should be fed upon fluid aliment, up to the time at least of the establishment of its dental apparatus; and nothing could be more stupid than the conduct of those that feed young babies with bits of fat ham, minced chicken, and other articles of food for which the child does not become fitted until the period when nature announces it to be so, by the establishment of an apparatus for mastication.

As a general rule, the child ought to be nursed at the breast until it is twelve months old; if the twelve months should happen to elapse about the beginning of June, it ought to be kept at the breast until the autumnal equinox, since experience declares that in the United States very few children can be severed just at the outbursting of the summer heats, without becoming subject to some degree of digestive derangement, which, when once begun, is not readily removed while the child is nourished artificially, but which either does not attack, or is readily overcome, if the supply be of the kind of food which is natural to it.

As to the nursing of the child, notwithstanding I deem it a sacred duty on the part of the parent to fulfil this obligation, yet it is questionable whether the obligation is not really set aside where the inducement thereto arises from a dangerous condition of the maternal health. If a man marry a wife having a hereditary claim and expectation to perish with pulmonary consumption, it would be better, both for her and the infant, to dispense with the giving of suck. It is probable that the infant has already caught a touch of the taint or the diathesis, almost in the act of conception, and if not then, within the course of the uterine gestation. The sooner all influences of the mother's life over it shall pass away, the greater is the hope of its escaping the terrible fate before it; and on her part, it may be said that the rudest and strongest health is oftentimes much diminished and shaken by twelve months of lactation; but, for a person having in the lungs the invisible seeds of a tuberculosis, to subject such a one to the exhausting processes of the long lactation, is to nurture and call them into a fatal activity.

I do not mean, in these remarks, to recommend that the lying-in woman should at once begin to throw back upon her constitution the fluxional movement towards the mammary glands, which can only be normally counteracted by the proper physiological action of the gland. Her own safety exigently demands that she should favor this fluxional movement for a few weeks; but after four or six weeks she ought to let her milk slowly dry away, and provide for her child a wet-nurse of unquestionable qualifications for the end in view. I can conceive that, by proceeding in this manner, a family might cast out of its stock even the tuberculous diathesis, in the course of a few generations. It is melancholy to contemplate the misery which is in store for those who, preferring the enjoyment of their natural and praiseworthy sentiments, turn a deaf ear to the warning voice of experience and prudence.

Counsel, however, is to be given by the physician, who is to be all things to all sorts of people; and it must happen that he shall have to counsel those whose circumstances forbid them to defray the extra expense of wet-nursing. Under such circumstances, the child must be fed; milk is its food, and the best succedaneum for its mother's milk is the milk of the cow—indeed, there is none other to be had in the United States; and it would be in vain in this country to recommend either the use of asses' or of goats' milk, which, in various countries in Europe, is abundantly provided for those who may find occasion to employ it.

With regard to the artificial alimentation of the child, if the Student should reflect a moment, he will come to the conclusion that the act of digestion is much assisted by the admixture, with the food that is ingested, of a due proportion of saliva. The saliva, though not so essential in the digestive evolution as the liquor gastricus, is an indispensable agent in the act. A child that draws its milk from its mother's breast by the suction power of its mouth may be almost said to masticate it, and in doing so it causes a stream of saliva to pass into the mouth, which is swallowed along with the milk. The proper excitant of the salivary glands is first, perhaps, the presence of alimentary matters in the mouth, and secondly, still more powerfully, the motion of the tongue and cheeks and jaws, in eating. Now, a child that is fed from a spoon may be almost said to have the food poured down its throat without swallowing it, and the same is true of the infant that takes its aliment from the edge of a bowl or cup. It is far more convenient and proper, in all cases of artificial alimentation, to simulate as closely as possible the natural functions, and I believe that the child will digest its gill or half pint of food more safely and successfully, if it be taken through the *biberon* than if taken out of a spoon or cup. Let the Student give ample attention to these considerations, and judge for himself whether the remarks be well founded or not, and thereupon base his professional counsel.

Without going here into a comparison of the different kinds of food, I beg to request the attention of the Student to the opinions which I have expressed upon this subject in my work upon *Diseases of Children*.

Of the Navel.—The navel being dressed in a manner heretofore described, it is usually left thereafter to the care of the monthly nurse or attendant, and the physician is rarely called upon to interfere, except when it becomes the seat of some diseased action.

The remainder of the umbilical cord, left after the severance of the child, soon begins to dry; the water of the Whartonian jelly contained in it escaping through the inorganic pores or crevices in the amniotic coat. The vein usually contains a small coagulum of blood, and the arteries become collapsed and entirely desiccated. In the course of from four to seven days, the cord has become so dry and thin as to resemble a piece of transparent yellow horn; the absorbents at the line of the demarkation early commence to cast off the slough, by establishing a crack or fissure all around its root: this fissure, growing deeper and broader from day to day, allows the desiccated vestige to fall away, leaving a small spot of raw surface, often not bigger than the head of a pin; for most of the wound becomes incarned or cicatrized as the process goes on.

While the child is in the womb, and even at the moment of its birth, the navel protrudes, often to the length of half an inch; but the two arteries, whose cut ends are attached near the surface of the new-formed cicatrix, act as cut arteries always do, by retracting, and thus serve to draw the navel inwards and downwards in the direction of the urachus. The remainder of the vein, which becomes a cord passing along the edge of the falciform ligament of the liver, is also, but in a less degree, retracted. These vessels serve in this way to draw the navel inwards, and to make the dimple of the umbilicus; but the deepest pit of the dimple will look downwards towards the bladder, for the retractility of the arteries is greatest. When the retraction thus effected is perfect, the tissues are drawn strongly inwards towards the inner aspect of the belly, and the vacuity in the linea alba, constituting the umbilical ring, becomes perfectly closed; but if this retraction be incomplete, then a plug of tissues contained within the circle of the umbilical ring prevents its absolute closure, and leaves the child liable to be affected with exomphalos or pouting of the navel.

It is clear that, in order to aid this retraction and complete it, a proper compress should be adjusted over the umbilicus and retained by the belly-band, whose use ought to be continued as long as its use is indicated. If the child is quiet, and little given to crying and straining with tenesmus, and if the dimple of its navel be perfectly well-formed, the belly-band may be left off at the end of the month; but the least disposition to protrusion, or a wintry season, furnishes motives for its longer continuance.

Of the Meconium.—The meconium of the child is a dark, viscous, green, diffluent matter, which is contained in its colon and rectum at the period of birth.

The quantity is sometimes very great, and the first alvine discharges consist wholly of this material. Three or four of the first evacuations serve in general to carry it all off; occasionally, it is so adhesive as not to quit the surfaces of the bowels: perhaps it is lodged in the cells of the colon, so that the bright bile-tinted stool of such a child, seen upon its napkin, induces a belief that the meconium is all purged off, whereas subsequent dejections show that no inconsiderable quantities have been detained in the intestine.

When the meconium comes off freely, and seems to be entirely discharged, giving place to excretions of a healthy hue and consistence, no medical precautions can be deemed necessary; but if the child is uneasy, crying, fretful; affected with griping pains, which are betrayed by its voice and by the frequent flexion and extension of its lower extremities, with an appearance of passionate impatience, and especially if some portions of the meconium seem to linger upon the napkins one after another, we should have reason to suppose that the surfaces are still vexed and irritated by this excreted matter, which ought to be removed by small portions of castor oil or some other convenient aperient.

Children that feed many times a day will generally be found to require several alvine dejections per diem. A child that satisfies its instinctive desire for food generally does so by filling the stomach until it is quite distended, and it will often happen that some portions of the ingested milk will pass off through the pylorus into the intestinal canal too early to have been subjected to the influence of the gastric liquor. Such portions of milk will, therefore, appear upon the napkins in broken or granulated coagula of a white color.

Most children, after filling the stomach to distension, enjoy the happy faculty of regurgitating the excess, so that the stomach soon becomes relieved of its over-fulness, retaining all that it has received, and subjecting it perfectly to the gastric digestion. A child that in this manner rejects the superfluity, and completes the digestion of what remains, will have small residue of its digestions, and therefore will have fever alvine discharges, which shall be smaller in quantity than those of the child a portion of whose undigested milk passes into the duodenum and jejunum.

Without being able to speak positively from careful observation, I venture to state that the neonatus in perfect health has three or four changes of its napkin daily, and I conceive that this is not too great a number; at the same time, I presume that a child might be very well, having only one dejection per day, provided it is known to have the faculty of regurgitating the superfluous ingesta, and provided also it has the appearance of enjoying a complete health.

I beg to inform the Student that he will meet with a good many children which shall have eight, ten, sixteen, twenty dejections per diem, and that he will often be called upon by anxious parents to prescribe for such seeming diarrhœa. The case to which I allude is not a diarrhœa; it is a case in which a child, nourished at a free and abundant breast, fills its stomach again and again with a gastromorphous clot of milk, a major part of which, being comminuted by the contractions of the organ, is driven off undissolved through the pylorus, because the child has not the power to get rid of it by regurgitation.

When I am called upon to give counsel in such cases, I do not always take for granted that the child is sick because the nurse or mother tells me it is so, nor do I admit that it has a diarrhœa because it has twenty stools per day. Under such circumstances I have often said, let it alone, do not interfere with the case at all, except by regulating the amount of its food; do not give it such frequent opportunities to suck, and judge carefully when it shall have got what is necessary for it, and then put it away. If you give medicine to stop its diarrhœa—which is not diarrhœa, but result of repletion—you will make the child sick, for if the child continues to live in the same way, so as to require twenty napkins per day, and you prevent the action of its bowels, by means of some astringent or narcotic medicines, you will make it really ill—it is a case for hygiene, not for therapeia.

I do not fear that I shall mislead the Student by the above observations, because, if he be a man of sense, he will judge for himself, and not from a book; he will inquire what is the nature of these dejections which are accused of being diarrhœa, and if he should find that they are such as I have above described, he will perhaps remember my words, and act in accordance with the indications that I have pointed out. If the stools consist of masses of slime—if they are altogether bilious—if they give evidence of an excessive acid saburra, then he will inquire into the particular wants of the case, and prescribe accordingly.

The mucous, the bilious, or the acid saburra may require only a teaspoonful of castor oil, a small quantity of rhubarb, a portion of magnesia, a half grain of calomel, or calomel with chalk. Perhaps he will be enabled to fulfil the therapeutical indication by prescribing a portion of lime-water and milk, or a little soda or potash mixed with water alone, or mixed in infusion of chamomile or some other bitter or aromatic garden herb. Possibly, he may find the fault to consist in a hyperneuric condition of the muscular apparatus either of the small or of the large intestine, and he will correct such an hyperneuria by means of an anodyne draught. An anodyne draught for the new-born infant should consist of half a drop of laudanum in a teaspoonful of water. To give half a drop of laudanum, let him direct the nurse to put two teaspoonfuls of water into a cup, and add one drop of laudanum thereto, which, being perfectly mixed and compounded, permits him to give, in one teaspoonful of the mixture, just half a drop—the other should be thrown away.

Sometimes the new-born child, instead of being troubled with too many dejections, is affected with costiveness. This costiveness is overcome either by a suppository of molasses candy, of a bit of castile soap, or a camel's-hair pencil dipped in castor oil, and thrust just within the grasp of the sphincter muscle. It may be remedied by an enema of tepid water, or water quickened with a modicum of salt, or molasses or castor oil; or the child may take a teaspoonful of a weak infusion of rhubarb, or a little magnesia, or a little rhubarb roasted in a saucer until it is slightly browned, or, what is better than all, a pinch of pure precipitated sulphur mixed in water sweetened with honey or honey of roses. Small portions of sulphur, mixed with honey water, appear to me to operate upon the neonatus more kindly than any other therapeutic agent, in this peculiar case; and the use of it, continued for a few days, often serves to remove an habitual disposition to costiveness. The Student should judge, however, in the cases committed to his care, as to the cause of the constipation. He knows, or he ought to know, that the bile furnished by the liver is the natural eccoprotic, and that, if that bile should be in just quantity and of due quality, it should take the place of all rhubarb, senna, and purgative drug.

If therefore, upon inquiry into his case, he discovers a deficiency in the quantity of the bile, or such modifications of its tint and other qualities as seem to call for his therapeutical intervention, let him judge as to the precise nature of that intervention. Let him ask himself what is the source of the blood that gives rise to the secretion of bile, or from which the bile is secerned, in the eliminating apparatus of it, the liver. He will see that the whole of this blood came from the aorta, through the cœliac and two mesenteric arteries; that the chief torrent of it, after being passed through the capillary circulation of the intestinal tube, hath been collected again by the radicles of the great portal vein, which lets it into the liver to be distributed through the hepatic branches of the vena portæ to the capillary tufts in the acini, whence it is carried off again by the nascent radicles of the hepatic veins, which are to discharge it into the cava—and so his question is answered, for he will scarcely believe that the hepatic artery is the secreting tube, but only the nutritious artery of the liver. When, then, he finds a child disordered as to the action of its bowels and liver, I hope that he will cast his eyes upon this great system of what the ancients called the mesaraic circulation, so that, inspecting the whole field of it, he may discern in what point of it the pathogenic principle resides.

I should think that he could not but look upon a hyperæmic condition of the capillary system of any large portions of the alimentary tube as matters important for the performance of the secerning functions of the liver; and see that retardation in the movements of the great external portal system, or of the great interior portal system, cannot but be regarded as giving sufficient causes of those modifications of the functions of the liver which he desires to cure. Under these views, it will not always be for him inevitable to administer mercurial remedies for slight derangements of the bile. He will rather provoke the peristaltic fibre to greater or to renewed action, with a view to remove those embarrassments of the portal or mesaraic circulation which he shall accuse of causing the hepatic difficulty, and he shall find that a teaspoonful of castor oil, or a pinch of rhubarb, or a modicum of magnesia, or an innocent dose of precipitated sulphur, is quite as effectual, and abundantly more safe than the vaunted power of the mercurial dose in these affections.

It appears to me that in the United States there is an indissoluble alliance between the word *liver* and the idea *calomel*, and that the notion of the alterative power of calomel springs spontaneously at the least suggestion of an hepatic or bilious derangement. I do not deny that calomel is a purgative, nor that it produces the most distressing nausea when taken into the stomach; nor that it may therefore, upon proper occasions, be rightfully administered, even to young children; but an examination of the circulation and of the innervation in those parts which stand before the gate of the liver, and which serve, as it were, as propyla, admitting the torrents of circulation into it, out of which the bile is to be taken by it, ought clearly to point to states of those parts, I mean the mesentery, the mesocolon, and the alimentary canal itself, as often the seats of those pathogenical influences which are discoverable only in their effects in modifying the bile.

I beg the Student to get the baby through the month without mercury, if possible; since, though I deem mercury an admissible remedy, I consider it a most desirable thing for the young child to avoid its too dangerous and powerful influences—influences capable of making such a profound impression upon the constitution as shall be felt in long after years. For my own part, notwithstanding I have long been laboriously engaged in the practice of my art, I feel very confident that I do not employ one hundred nor even fifty grains of calomel in the course of twelve months; and that my patients are not the worse off on that account; while I myself am preserved from an intolerable anxiety which its administration always excites in my mind.

Of the Gum.—Children coming into the world—issuing from the soft and unctuous waters by which they have been surrounded—are first washed clean, and then exposed to the stimulating effects of the atmospheric air; and are, then, covered with clothes, all of which things serve to irritate the tender and sensitive outer covering of the body, the derm. Moreover, the first copious indraughts of atmospheric air, changing the blood and converting it into tenfold more oxygeniferous streams, must have the effect almost of an intoxicating inhalation, like nitrous oxide, upon the child. The corpus mucosum of the skin becomes instantly reddened after birth, and, in many children, so red as to present the appearance of engorgement or inflammation; and there are not a few of them, indeed, in whom, in this first burst of dermal circulation, the hyperæmia is so considerable as to be followed, in the course of a few days, by desquamation, like that which succeeds to an attack of measles or scarlatina. We should not be surprised, therefore, to observe slight inflammations and eruptions of the superficial tissues. There are few children, indeed, who fail, in the first three or five days after their birth, to be attacked with a slight papular eruption which is called red gum—a case in which a central papule is environed by a red aureole. It requires no particular treatment, since, like a vaccination, it tends to cure itself. Common custom and usage, however, prescribe the administration of weak aromatic infusions, which are supposed to possess a diaphoretic quality. Infusions of catmint, infusion of fennel or anise, infusion of saffron, &c. &c., are commonly resorted to, and as they do not much harm, it is not always, perhaps, the province of the physician to object to their exhibition.

This red gum, or *strophulus intertinctus*, differs from the other sort, *strophulus albidus*, which exhibits a larger papule, more nearly resembling the blister of varicella, though much smaller than the varicella. It is not surrounded by a red aureole, like the *strophulus intertinctus*.

In children affected with either form of these eruptions, it is highly important that the skin should be frequently powdered with some proper fecula, and there is none preferable to that of the arrow-root. The application of the fecula, under such circumstances, appears to me to possess a remarkable power to appease the hyperæmic and hyperneuric condition resulting in this form of eruption.

Sore Mouth or Aphthæ.—In the course of a few days after the birth of the child, it is common to find it a little more sleepy than ordinary, and to hear the nurses say, "It is sleeping for the sore mouth;" and soon after, upon examining the interior of the lips, the gums, and the tongue, they are found to be overspread with very minute white flakes, that look like small curds of milk. These are aphthæ, or the thrush, or the child's sore-mouth. The white deposit consists of a small quantity of excretion, albuminous, or, possibly, fibrine of the blood, which is held in contact with the surfaces from which it exudes, by a delicate film of epithelium, so that, with the finger covered by a bit of rag, the white speck cannot be wiped away.

In a short time—that is, in the course of a day or two—the pellicle of epithelium gives way and the crust falls off, leaving sometimes minute sore, and sometimes a renewed surface of epithelium, from whic the white crust has fallen away.

Of course, this malady is the result of inflammation of the corpu mucosum of the interior of the mouth and lips, and it is to all intents an purposes a true stomatitis, or mouth-inflammation. In nine cases out ten it cures itself, and it is, probably, in its nature, very like the *str phulus intertinctus*, or *strophulus albidus*, of which I have just spoke which are affections of the mucous body of the derm, whereas this an affection of the mucous body of the mucous membrane.

It is usual in this case to accuse the child as laboring under an ac saburra, and to furnish it, in consequence of that accusation, with dose of physic, which for the most part it does not really want. Bu inasmuch as this mild stomatitis may rise to a considerable height, b coming, in fact, a general and extensive inflammation of the tissu within the mouth, extending backwards into the fauces, and from t isthmus faucium into the throat, it is worthy of attention on such casions, and should be treated in conformity with its nature.

The custom, among physicians and nurses in this part of the countr is to attack the local malady by means of portions of borax a powdered sugar, of which a pinch is frequently to be put upon t tongue of the child, which is supposed to have sovereign power as remedy for the malady. There is little objection to the use of the borate of soda; and it answers a good purpose, being a substitute severer and useless remedies: now and then, when the stomatitis ri to a great and dangerous height, it is useful to wash the mouth of t child with a mixture of lime-water and fine Peruvian bark in powd or to touch the irritated surfaces with a camel's-hair pencil, dipped a weak solution of nitrate of silver, of a strength ranging from o grain to two or three grains to the ounce of distilled water; or a soluti of sulphate of copper in combination with sulphate of quinia. T grains of the former and half-a-dozen of the latter, in an ounce of wat furnish a mixture which may be efficaciously applied by delicate co tacts of the camel's-hair pencil to the affected parts. If fever aris or saburra or disorder connected therewith, let the Student bethi himself of the efficacy of his doses of calomel or magnesia, or ape tive medicine of whatever kind.

There is another kind of sore mouth which looks like this, and whi is called muguet, and which is, I think, not so often met with in th country, as by some European practitioners. It is supposed to be vegetable substance attaching itself to the interior of the mouth, an *sporiferous* in its nature, so as to be capable of greatly extending itself when once planted there. It differs from aphthæ or thrush by being uncovered, or having no investment of the stomal epithelium. I am not familiar with it, and refer the Student to the authorities for further information.

Icterus.—The neonatus is very liable, in the course of a few days after his birth, to be affected with a signal yellowness of the whole skin and eyes, and to have his urine so stained with bile as to impress its color upon the napkins when dried from the urinary discharges.

The icterus of the young child doubtless depends upon the regurgitation of bile from the pori biliarii into the returning branches of the hepatic vessels, whereby the whole mass of the blood becomes stained with its yellow coloring material, which begins to appear first upon the colorless adnata, and next upon the whole dermal surface. Such a state of the skin does not imply absolutely a disease of the liver itself, since there are certain irritations affecting the duodenum, producing some degree of engorgement round about the ductus communis choledochus, and passing up along that tube, which might well suffice to detain the secreted bile in the pori biliarii, and cause its regurgitation in the manner above indicated. A dose of purgative medicine, freeing the stomach and duodenum and jejunum from some saburra, and relieving them thereby of a troublesome hyperæmia, seems to me likely to set the gates of the bile wide open, so that, the regurgitation no longer being effected, the constitution soon eliminates the coloring matter of the bile from the blood, and the skin recovers its healthful hue and tint.

My clinical experience, which must have furnished me with numerous examples of these early hepatic derangements, as they are supposed to be, has left with me no painful impression of the dangerousness or the troublesomeness of the affection, which is transitory, disappearing in the course of a very few days.

In those cases in which the inspection of the dejections shows that the bile escapes freely through the ductus communis into the duodenum, I am always willing to wait for the result of such outflowing of the liquid, and the spontaneous return of the liver to its normal functional rate. Whenever, on the contrary, I discover whitish or clay-colored stools, or stools tinted faintly with a whitish-yellow bile, I am willing to administer to my patient some doses consisting of the sixth part of a grain of calomel, repeated three or four times a day, and followed by a convenient quantity of castor oil or magnesia, or other approved aperient.

Coryza.—Many young children suffer severely, soon after birth, from attacks of coryza, commonly, by nurses and old women, called snuffles, and, when the attacks are severe, morbid snuffles. Some children, indeed, appear to me to have come into the world giving evidences, with the very first acts of respiration, of the presence of this malady. I do not mean to say that they have coryza before they are born; but rather that they are born with certain tendencies which allow coryza to declare itself immediately after birth.

Coryza or snuffles is a disorder of the mucous membrane of the nostrils and air-passages of the head in general, occasioning a great abundance of mucus to be excreted from them; which, filling up the air-passages and obstructing them, causes the child to breathe with difficulty, making a rattling or sniffling-noise with every respiratory movement.

Many of the cases, being very slight, and going off after a few days, scarcely serve to attract the attention of the physician, and the wise women content themselves with the usual remedy, which consists, in this country at least, in the application of a little grease or tallow to the bridge of the nose. While it is perfectly true that coryza is in many cases a matter apparently of small moment, yet it is proper for the Student, when he observes its existence in the little nursling, not to pass it by idly and without notice, for it is capable of producing the greatest annoyance in the lying-in-room by interrupting the sleep of the baby, and thereby interfering with the repose of its parent, a circumstance always to be deprecated. But more than this, coryza may kill the child outright—a thing to be deplored, in itself considered, and perhaps still more to be deplored on account of its possible influence on the health of the mother, who, in the early days of her lying-in, is easily moved by slight pathogenical causes, which, when they but begin to operate, may have results the most disastrous.

Let the Student, therefore, not idly neglect a case of coryza in the neonatus; but he should extend his watchful care both over it and its hyperæsthetic parent. A lying-in woman is not like anybody else, and things may kill her, which, under other circumstances, might pass by her as the idle wind.

I wish the Student to remember that the new-born child has no reason, but only instinct; that it is a purely instinctive creature, and implicitly obeys the provocations of its instinctive nature. It has an instinct to breathe, for which purpose it is supplied with only two respiratory stigmata, to wit, its nostrils. It has another aperture, its mouth, which its instinct teaches it to use only as an agent of its alimentation, not as an agent of its respiration. I wish the Student to understand that, if one should stop the nostrils of a new-born child with two plugs of cotton or lint, so that no air can enter into those respiratory stigmata, the infant will surely die within from one to three days, because its instinct teaches it to breathe through its respiratory passages, and not through its mouth. I am sure that the subject of this experiment will persistingly close its mouth or its isthmus faucium, and perish under vain attempts to continue its respiration through the closed-up nostrils.

When children die from coryza, as they not unfrequently do, they die in the manner just pointed out; and I adjure the Student, who shall read this passage, to give his careful and candid attention to the doctrines set forth in it, and, looking upon the child that is seriously ill with coryza, see how, after making repeated attempts to aspire air through the nostrils, it suddenly starts forward, throwing out its hands with an appearance of agonized distress, and then, opening its mouth widely, suddenly makes a full and complete aspiration of air, which, dispelling for a moment the sense of suffocation, permits again the renewal of its vain attempts to breathe through the natural openings. If it had reason to guide it, as a man has, it might breathe with perfect facility throughout the most dreadful attack of coryza, even coryza maligna; but it has only instinct for its guide, and that instinct teaches it to breathe through the natural openings.

I will take this occasion to remark that loss of life from coryza is to be observed sometimes in children many months old, and that a child even over two years of age may be lost in this way, as I have learned by disastrous clinical experience; and if the Student who reads these passages should find any hesitancy in his mind to admit the truth of my explanation, I believe that all doubt would vanish from him if he would please to make the following experiment. Let him compress the alæ nasi together with his thumb and finger, and then make half a dozen consecutive attempts to breathe, keeping his mouth shut at the same time; he will find that the effort to send down the diaphragm and expand the thorax will produce within the whole chest a deep feeling of distress, amounting almost to pain. But let him repeat the attempts five or six times consecutively; and then, while making the last attempts, suddenly open the mouth and permit the air to rush in a torrent into the air-passages, he will have the sensations which I attribute to the young infant, when, after its repeated attempts to breathe through the nostril, it starts forward, throwing its hands wildly abroad, and filling its lungs with air through the opened mouth.

If the Student, after experiencing these sensations, will reflect upon the effect of such efforts, repeated through two or three consecutive days by a tender infant, just born into the world, he will agree with me that stopping of its nasal passages is a thing greatly to be deprecated. I do not mean him to understand that in ordinary cases of coryza the child takes no air through its respiratory stigmata, for it does get that small portion on which it subsists in that way, up to the period, at least, in which the apertures, having become totally obstructed, compel it at last to make the sudden and convulsive aspirations through the mouth which I have attempted to describe. But the difficult and interrupted aspiration of air through nostrils only partially obstructed is sufficient to diminish the amount of oxygen breathed upon the blood, and the torpid and imperfect innervation produced by the imperfectly oxygenized blood in the vessels of the brain is followed by various derangements in the action of the organs whose force depends upon the regular supply of the *vis nervosa*.

A young child, then, laboring under a considerable coryza, will have carboniferous blood in the systemic circulation; it will be pale, languid, and unhappy, and is always exposed, in consequence, to attacks of pulmonary or cerebral or abdominal disorder. I look upon a child, whose nostrils are half stopped up, whether by mucus, or by submucous infiltration, as in a state analogous to that of an infant laboring under a moderate degree of pseudo-membranous laryngitis; for the one or the other equally prevents the aëration of the blood with its normal amount of oxygen, and all the consequences of such a state must result.

I ask the Student whether the constitutional disturbance arising from such a degree of disorder as exists in the Schneiderian surface in a case of coryza could possibly be so disastrous, were it not for the accidental interruption occasioned by it to the oxygenating power of the respiration. I should think that an inflammation ten times more violent would be incapable of producing so great an amount of constitutional disorder through any other means than those above alluded to, for the reaction of the heart and arteries occasioned by it, and the distress of the nervous system occasioned by the perception of it, would be nothing —I was going to say less than nothing—were it not for the accidental interruption to the oxygenation. Therefore, I repeat that the slightest attack of coryza is worthy to be regarded.

But the question arises what shall we do for the cure of this case; how shall we free the Schneiderian membrane from its hyperæmia and hyperneuria; how shall we prevent its follicles from furnishing this excessive amount of mucus, or how shall we take away the submucous infiltration, which causes the cavities to collapse and definitively to close them? Will the vulgar remedy, greasing the nose, have this effect? Certainly the Student cannot rely upon such a therapia as that. Will he purge the child? Will he give it a warm bath? Will he apply a leech within the margin of each nostril? Will he give it diaphoretic remedies? Will he regulate the temperature of its apartment? Will he cause the aperture of the nostril to be kept free from the scales and incrustations produced at the orifice by the desiccation of the mucus that falls upon the very margin of the nostrils, and sometimes forms tampons or plugs running far back into the cavities of the head? It is well if he will do all these things; but experience, the best of teachers, will show him that such remedies have little power over the disorder, and the coryza goes on notwithstanding all his attempts. Will he produce a useful therapeutical impression upon the mucous passages by touching them with a delicate camel's-hair pencil, dipped in proper solutions of nitrate of silver or other metallic salts? Even these things fail, and often fail, but there is a treatment which experience, the best of teachers, has taught me never fails. I scarcely dare, in a formal work, pretending to a character of science, to say what this treatment is, and yet I must, with undoubting confidence, recommend the Student to adopt it.

When a new-born child is seized with a coryza that attracts my attention, I invariably direct a skull-cup made of flannel, to be so constructed as accurately and perfectly to fit the form of the cranium. I direct this cap to be fastened upon its head, and to be left there for three days and nights, and I always feel sure that within about that time the coryza will have totally disappeared. I mean to say that the cap should fit the head closely—not loosely, for I desire that the air of the apartment should not pass freely under it.

If the Student will try my method and fail, he can but be disappointed, which, I am confident he will not be; if he adopts all or any of the other remedies that I have hinted at above, he will surely meet with disappointment many times—by my method perhaps never.

It is hardly worth while to reason upon this subject, but let him read Dr. Denman's account of coryza, and the accounts contained in the treatises on the diseases of children, in order to learn how he can, in a better manner than that I have pointed out, and more effectually, counteract the pernicious existence and tendency of this troublesome malady.

CHAPTER XXIV.

CYANOSIS NEONATORUM.

In the month of November, 1832, during the prevalence of Asiatic cholera, I had charge of the case of Mrs. Taylor, of North Fourth Street, No. 503. She was seized with symptoms of the epidemic, being at the time about seven and a half months advanced in her gestation. The attack was violent, and led to the premature expulsion of the child, which was born living, though very feeble. It soon began to turn blue, in consequence of its being affected with cyanosis, commonly at that time called blue disease; and as its hue grew darker and darker, its lessening respiration, and the coming on of convulsions, caused me to think it could not long survive; indeed, it came apparently to the point of death.

The young mother, who was still ill with her cholera, could not be insensible to the danger of the child, and I perceived that the complication of a moral shock with her other irritations, might render the cure of her own malady more difficult, if not impossible. It became, then, in view of the mother's position, a matter of great moment to rescue the child from an apparently imminent death. These reflections, which I made at the time, gave me great pain; for, while I deemed the state of the child one of partial asphyxia from the mixture of its venous with its arterial blood, the mixture being made by injection through the foramen ovale of the auricular septum, I could devise no treatment upon which to rely for obviating that injection.

I was deeply concerned, and knew not what to do. Suddenly, I reflected upon the structure of the fœtal heart, and the route of the fœtal circulation, and I said, if I bring the septum auricularum into a horizontal position, will not the blood in the left auricle press the valve of Botalli down upon the foramen ovale, and thus save the child, by compelling all the blood of the right auricle to pass by the iter ad ventriculum, and so to the lungs, to be aërated?

Having practised Midwifery for many years, I had on many occasions witnessed the fatal termination of cyanosis neonatorum, both in the premature and the mature child. I had seen children at five, and at five and a half, at six, and at seven months, vainly attempting to carry on respiratory life, and observed them to perish with the signs of cyanosis, whether from too large a foramen ovale, or from imperfect development of the respiratory machinery of the lungs from atelectasis.

In the case now under consideration, I placed the child, which seemed nearly dead, upon a pillow, on its right side, the head and trunk being inclined upwards about twenty or thirty degrees.

Upon placing it down in this manner, it became quiet—began to breathe more naturally; to acquire a better hue of the face, hands, and feet; until, in a very short time, it was quite well again, and did well; having no further returns of the attack of cyanosis neonati.

I shall not conceal the satisfaction I derived from the successful result of my reflections, thus put into practice in the case; for I thought, and I still think, that the child would have died inevitably, had I not thus closed the valve. In very many instances, during a long obstetric experience, I had never made such a reflection upon the means of saving the blue child, of which I had seen many cut off. I believed, and I still believe, that I was the first to invent the treatment; and the first case in which I put it in practice, was thus eminently successful. I am not now aware that any other person had before suggested it, though in his account of cyanosis, M. Gintrac gives, in case 5th, an account of Dr. Wm. Hunter's patient, æt. 8, who obtained relief from a paroxysm, by lying still upon his *left* side, which always relieved him. After his death, the ventricular septum was found to be wanting, or rather perforated near the base of the heart, so that the aorta received the injection of the right, as well as of the left ventricle.—Vide *Gintrac*, p. 33.

Six years later, in my *Philad. Pract. of Mid.*, edit. 1838, I published some remarks on cyanosis, or blue disease, which being written in much haste, I did not at the time remember the circumstances of the above case, which occurred in Nov. 1832, in Fourth Street above Poplar, No. 503, in a child of Mr. Taylor, a builder, formerly of this city.

Since the date of my first application of this method, twenty years ago, I have had numerous occasions to put it in practice, and not a few opportunities of examining the state of the heart after death; in some of which, after vainly applying the treatment, I had come to the conclusion that other causes, not patency of the foramen ovale, must exist, to contravene the curative tendency of the method.

My publications—and my explanations to friends—with the lectures on the subject that I have now delivered to many hundred Students of Medicine, have rendered this treatment of mine a popular one—to such an extent that, in various States of the Union, the treatment is become familiar to the profession. Many monthly nurses have become acquainted with it, and I presume it is so divulgated throughout the land, that children suffering from the malady will very generally have the advantage of its application, if it be really advantageous, and this the more probably, since no reasonable objection can be found to the putting of it in practice.

I make these remarks, founding them upon letters I have received from gentlemen in the different States of the Union; from conversations, and from statements made to me by Medical Students on their arrival here, in the autumn, of cases treated by their instructors.

This explanation will show that I am warranted to say, that my invention has become extensively known, and is to a considerable extent understood and practised in this country; the more especially as it has been reported by many hundred Medical Students, that are now settled in the North, the South, the East, and the West.

The following is extracted from a letter to me dated Pittsburgh, Dec. 7, 1838, from Dr. W. F. Irwin.

CASE.—"The second item of information derived from your work is that in which you lay down the only rational explanation and mode of treatment for that formidable disease of infants, called 'morbus cœruleus.' During a practice of twenty-five years, I have had about twelve cases. In one family I lost two cases in succession, with an interval of two years. In this family there appeared to be a singular tendency to the disease. From the mother's account, I should conclude that out of six deaths in her family, five must have died of morbus cœruleus. In deference to authority, I have generally pursued the plan recommended by the late Dr. Hosack, which may be seen in the Appendix to *Thomas's Practice;* and I must say that I was never satisfied with it, as it appeared to me to have no sort of adaptation to the then received pathology of the disease. In some cases, I have thought that a tepid salt-bath produced a beneficial change in the color of the skin, and in the respiration. In two cases, a tablespoonful of blood drawn from the cord seemed to have a good effect. In a case that occurred in August last—the child, which had been well for five or six days, suddenly changed color—had laborious and interrupted respiration at long intervals. I was sent for immediately, and ordered a warm salt-

bath, in which the change of color from blue to the healthy tint was remarkably rapid. The attending physician came into the room while I was engaged, gave some powders, and the infant died. In October last, I had a strongly-marked case in the afternoon at about six o'clock. As soon as the nurse announced the condition of the child, I had the washing suspended, and ordered the child to be placed on its right side, and to be left undisturbed until the following morning. At my visit next day, I found the infant healthy in every particular, and it has continued so until the present time. I have been so pleased with what I deem your philosophical mode of treatment, and its success in the above case, that I could not refrain from communicating the result."

CASE.—I have now before me a letter from Paul F. Eve, M. D., Prof. of Surgery in the Medical College of Georgia, dated Augusta, Feb. 2, 1848. In this letter, Dr. Eve informs me that he was in attendance 22d Nov., 1847, upon Mrs. C., then affected with premature labor of an uncertain date of gestation. The child, a male, which was born after an easy travail, weighed between five and a half and six pounds. The testes were not yet in the scrotum. The respiration was at first carried on by sighs repeated once in five minutes. The child was once supposed to be dead, and given up as lost; but by breathing into the lungs it revived; and then, upon being laid upon its right side, where it was kept during four days, it perfectly recovered, and was healthy at the date of the letter. It was not dressed for three days. Every motion, for some time after its birth, would produce the cyanosis. Dr. Eve is inclined to believe it was six and a half months in the womb.

CASE.—Feb. 11, 1848. Mr. S. C.'s son, æt. 11 weeks. Very stout and healthy since his birth. Was vaccinated on the 3d instant, and has now a full-sized vesicle and areola; slept badly last night. This morning was much agitated and cried long—became blue as to the whole face—moaned for a long time. His mother supposed he "was going into a fit," and could not otherwise account for his strange appearance. (She has had six children.)

The child was crying when I arrived. The upper lip was very livid, and the countenance wore an air of distress. I laid it down upon its right side; it became quiet, and the livid areola vanished. I turned it on the left side, and the dark livor of the upper lip reappeared. Upon rolling it on the right side again the color disappeared, but returned when I replaced the infant on its left side. I gave it a teaspoonful of oil, with orders to lay it on the right side. Feb. 12th. Had a good night, and seems well to-day. In dressing it, the mother says, it became livid. She observed that it was on the left side, but upon turning it on the right it recovered, and has been well ever since. Jan. 3d, 1849, I believe this child has had no indisposition since the foregoing date.

CASE.—In March, 1848, I attended Mrs. G. T——, who was at the time delivered of a child at six months and ten days. It was deeply cyanosed for four days after its birth. The nurse kept it almost wholly reclined on its right side, and the infant, now about nine months old, presents a good prospect of a successful rearing of it. In this case, the child was certainly relieved when laid upon the right side.

CASE.—In the early part of the year 1848, I delivered Mrs.———, Thirteenth Street, of a fœtus at six months. It breathed well at first, and uttered loud cries. But cyanosis came on the third day. I many times caused the livor to disappear by turning it on the right side, and made it return by rolling the child gently over to the left side, and *vice versâ*, as often as I repeated the experiment. It died after some days. The foramen ovale was slightly open, and the lungs were partially affected with atelectasis.

Here is another letter, dated Antrim, Alleghany County, Penn., Feb. 11, 1848, which was addressed to me by Dr. S. Schreiner, a graduate of the Jefferson Medical College.

CASE.—"Mrs. A. S——r was delivered on Tuesday, Jan. 11, 1848, at 7 P. M., of a male infant. Nothing peculiar transpired during the gestation or delivery. Parents healthy; mother quite lusty. Supposed weight of the child about eight pounds; it seemed of full age, healthy, and well to do. About 9 P. M., it seemed to have a violent attack of colic; cried violently. All attempts to pacify it were vain, until about midnight, when it became quiet, and was laid in bed behind the mother, where it remained until about 8 A. M. on Wednesday. At that time the mother awoke, and thinking it breathed strangely, asked the nurse to take it up, to see what was the matter. She did so, and observed that it was of a dark-purple hue; the breathing seemed to cease; it was strongly convulsed, the fingers being clenched firmly against the palms of the hands."

Dr. S. informs me that the child was now removed from the lying-in chamber, in order that the mother, after she had been told it was dying, might not witness its last agony.

"Upon remaining so for some time, it gasped for breath, the purple discoloration faded from it, and the paroxysm was over. It remained quiet, without any motion whatever for about three hours, when the fit returned again; and again it did so, each paroxysm continuing longer and increasing in intensity until Thursday (the following day), between four and five P. M., at which time I first saw it. During this time it had seventeen attacks, the duration of the last one being over forty minutes. The attacks returned at intervals of a little more than an hour.

"Its appearance, when first seen, was as follows: It laid motionless upon a pillow in the nurse's arms; pulse irritable; cheeks suffused with a scarlet flush; respiration short and quick; (it seemed as if fever was present;) dusky color of the skin, except the bright spot on the cheeks. Soon its face, then its body and limbs, became of a dark purple or nearly black color; respiration, a short gasp at long intervals, gradually increasing until it was altogether suspended for twenty-minutes; pulse grew fainter and fainter, until it ceased at the wrist, and the heart only gave a heavy throb at long intervals. Gradually, the pulse became (again) perceptible at the wrist—the discoloration vanished, and the paroxysm was over.

"Though the parents and all present declared there was no use in attempting anything for its relief, they consented that a trial should be made. I had it laid in the position recommended by you in your course of lectures, and in your *Phil. Prac. of Mid.*, upon the right side, at an angle of 30°, enjoining strict adherence to the position.

"From its flushed appearance, and the congestion seemingly present, I should have recommended leeches, had they been at command. I remained long enough for another paroxysm to have taken place, judging from the previous intervals, but it did not take place. During this time it attempted to cry, but made no sound whatever, though it seemed to cry violently. After this it passed some meconium, and took a little milk and water which it sucked from a rag placed in its mouth. I was told these were the first motions of the kind it had made for twenty-four hours. They had before poured some nourishment down its throat, but it appeared to bring on a fit, and they desisted. I saw it again the next morning. It had two returns of the disease; so very slight, however, as only to be observed by the face becoming darker; but they continued only a few minutes. I should not forget to mention that, after each of these, perspiration ensued; slight attacks first, but after the second very copious.

"Pulse at this time appeared normal; respiration easy, but somewhat quick. I saw it again to-day. Has had no return of the paroxysm, and is in excellent health, with the exception of an occasional attack of colic."

I beg the Student here to reflect upon the nature of the fœtal circulation, and remember that it tends to undergo a constant change, from an early period of its embryonal existence up to the time of its complete uterine development. For example, in the commencement, the embryon has no lung at all, and of course, all the blood of the right or pulmonic heart, passes over to the left or systemic heart, by means either of the foramen ovale or the ductus arteriosus. In proportion as the child approaches its viable age, its lungs become more and more fitted for their breathing office, and the pulmonary artery and veins acquire power to transfer larger and still larger quantities of blood through the lungs. As the pulmonary artery increases in power, the ductus arteriosus grows less, so as to be ready to transfer the whole of the work to the pulmonary artery as soon as the fœtal lung, freed by the act of respiration from its fœtal atelectasis, is also liberated from what might be perhaps properly denominated its atelectasis of pulmonary vessels, or vascular atelectasis.

Previous to its birth, the lungs of the child are solid—or rather the air-tubes of them are in a collapsed state—but, the descent of the diaphragm, and the expansion of the lungs, opens all those air-tubes to the atmosphere, down to their lowest cell. In the same manner, the pulmonary artery, with its branches, is at the same moment set free from its *quasi* collapse or atelectasis; and the blood of the right ventricle finds an easy escape by the pulmonary circulation; whereas, a major part of that blood had, antecedently, been accustomed to flow off by the ductus arteriosus.

The blood of the right ventricle, in establishing its new route to the lungs, does so, by virtue of a sudden increase of its diastolic power. Previously to the establishment of respiration, the ventricle could be said to expand for only one-half of the sum of the pulmonic circulation, since the foramen ovale had always, before, carried its moiety of the blood into the left auricle. The right auricle was, from the beginning, fully expanded in diastole; not so as to the right ventricle. It is a curious fact that, though the auricle was *ab origine* in full possession of diastolic power, the pulmonary artery, capillaries, and veins—as well as the pulmonic ventricle, were left in a state of partial atelectasis, from which they could be delivered only by the act of respiration, which at the same instant put an end to the fœtal atelectasis pulmonum.

This sudden expansion of the thorax serves as the means of instantly converting the fœtal characteristics into those of the respiring mammal; and when the conversion is plenary, or complete, the function may be said to be established.

It often happens, however, that, instead of this complete establishment of the circulation, it is only partially effected; and the child fails to acquire the bright or florid tint that results from a full and perfect aëration of its blood. It remains in a torpid condition, and the hue of its skin is, perhaps, only less livid than it was when it depended for its exaggeration upon the placenta alone.

Many causes may serve to bring about this failure in the conversion. All those that act in such a way as to compel the blood, in part, to pass, as before birth, through the foramen ovale, can be cured by any method that shall be able to close the valve of the foramen ovale; and this is evident, because, if the foramen ovale be shut by its valve, all the blood of the right auricle must pass beneath the tricuspid valves, and so by the right ventricle and pulmonary artery, to be aërated in the lungs.

The publications I have in various ways made of this doctrine, have had the effect to institute far and wide in the land, the knowledge of the method which I discovered, and which I humbly here claim to be my own. I do not believe that any physician ever thought of it or put it in practice before that occasion, which I have mentioned at page 722, to wit, in November, 1832. I look upon it as an important discovery, which I have no doubt has already saved, and will in future, save many lives, that could not by any other means be preserved.

Many persons have asserted that my explanation is erroneous—and that the lift of the valve of Botalli is not the cause of cyanosis—but that stricture or contraction of the orifice of the pulmonary artery is the cause; and that, when the pulmonary artery cannot deliver with sufficient rapidity what it receives, the current is backed on the venous system, and so gives rise to the cyanotic hue and the other symptoms.

After carefully weighing these objections to my rationale, I am compelled to reject them, and hold fast to my own—not, I trust, from pride of opinion, or a wish to arrogate a vain and undeserved merit as a discoverer, but because I find, in my own rationale, encouragement to apply my method; while the other rationale gives no such encouragement—and does not, indeed, offer a suggestion of treatment, but leaves us where we were before November 1832.

I shall here set forth many other reasons that compel me to adhere to the views I have long maintained, and—

1. If the foramen ovale could remain, after parturition, of the same size as before the birth, the orifice of the pulmonary artery would also retain its embryonal or fœtal diameter. Indeed, the pulmonic ventricle would continue in its state of partial *ante partum atelectasis;* for nobody, I think, will pretend that the heart dilates to compel the blood to enter, as by a suction power, or exhaust-power. It is always dilated by the blood forced into it and distending its walls. But if half the blood flows off by the foramen ovale, it cannot receive, with the remainder, a quantity sufficient to compel a full diastole.

2. This condition serves to keep the foramen ovale open, the edge of the valve being driven off to the left by the stream.

3. If the valve be now shut down, the ventricle must yield, and make a complete diastole. Its contraction driving its contents through the orifice of the pulmonary artery serves as a dilator, and the stricture vanishes, sooner or later, under this dilating force. To shut down Botalli's valve, then, is to open the ventricle and its pulmonic orifice; while to constringe either the ventricle or the orifice is to lift the valve.

4. The difference between me and my objectors is simply this, that the pulmonic constriction causes the cyanosis, according to them, but the lift of the valve allows the constriction, according to my view.

5. In the cases I have cited at pp. 722 to 728, I have shown that my explanation gives a foundation of a successful method; and I am convinced that many hundreds of lives have already been preserved by it. If this be true, then, it ought to sustain my position, since so many children have been at once and completely rescued by closing the valve. If they were rescued, it could only be by the closure of the valve; and even if the cyanosis arose from the want of expansion of the ventricle, or of its pulmonic aperture, the close of the valve completed that expansion and cured the patients.

6. My objectors seem almost to lose sight of Botalli's valve in this discussion, and forget that it is a reality, and must have the function to close the foramen. Either it does this or it does nothing. If it does this in order to establish the pulmonary circulation, but sometimes fails to do its office, let us help it, or compel it to do its duty, by laying the child on the side to shut the valve down.

The disorder produced by these accidents used to be called *morbus cœruleus*, or blue disease, now known as cyanosis. Let us inquire what is the real nature of this cyanosis, and the causes why it produces its peculiar symptoms.

The blood is either venous or arterial, or, as Bichat denominates it, black or red blood. The red blood of the arteries is transferred to the veins by the channels of the capillaries. It is in traversing the capillaries that the red blood deposits its oxygen, and so, when arrived on the venous segment of the circle, has become black. The capillaries may be regarded then as a sort of strainers or filters, whose office, in part, it is, to take oxygen out of the blood for the service of the tissues. Whenever the tissues are capable of taking oxygen from the capillary blood, the tissues in which capillaries exist have their normal hue or coloration; but if there be none, or an insufficient supply of oxygen, they become livid.

I maintain that cyanosis, as a disease, is essentially of the same nature as asphyxia.

But the question now recurs, as to what is asphyxia. In my opinion asphyxia, essentially considered, is black blood in the capillaries of the brain. Some physicians insist that asphyxia is black blood in the lungs. I contend that asphyxia is black blood in the brain. Asphyxia is a state of the brain in which that organ cannot extricate, or give out the life-force—the innervative force—the stream or current of nervous force—the biotic force—and I contend that it fails to do so, for want of oxygen to react upon the neurine. Cyanosis is the sign of the presence within the brain-capillaries of non-oxygeniferous blood, which is dark or purple or black blood, as Bichat calls it. The purple, or dark hue of cyanosis, is caused by the presence of black blood only in the capillaries. But, when this dark hue of the cutaneous capillaries is seen, it is evidence of a similar hue of all the capillary blood, whether in the abdominal, the thoracic, or the cephalic cavities and organs. This purple state of the blood is not fatal, except it exist in the brain, whose power it suspends. If it be chased out of the brain, by oxygeniferous streams of arterial blood, all the organs and tissues that lie under the control and dominion of the nervous system, immediately recover their power. If the brain dies, they all perish in its fall. If a man die, therefore, with asphyxia, he dies because he has black blood in the brain, not because he has it in his leg or arm or skin.

A man may die from fainting, or lypothymia; and in this case he loses life, because the action of the brain is suspended. The suspension, in this instance, appears to me to depend upon lessened tension of the encephalic mass from the sudden withdrawal of a portion of the blood that ordinarily distends its vessels, as in sudden violent hemorrhage, in certain pathemata mentis, sudden changes of posture, &c. &c.

Asphyxia is lessened or suspended somatic innervation from privation of the oxygen-reagent. Fainting is a similar suspension from reduced tension and pressure; either may be fatal; but each requires its appropriate treatment, which is different in each case. In a certain sense, therefore, fainting is asphyxia, or soon leads to it.

Asphyxia is not a status of the trunk or members; it is a status of the brain, and only of the brain. The livid hue is a result, or an accidence of the asphyxia.

If the vessels of the brain be injected by the carotids and vertebrals with carboniferous blood, the intellectual or perceptive, and the coordinating and motion-giving brains cease to do their office; if new injections fill these same vessels with oxygeniferous blood which chases out the former, the powers of the brain are reinstated, provided the mischief have not already gone too far.

A man etherized, or affected with chloroform, is, to a certain extent, asphyxiated, besides being poisoned; the same is true of him as of the well-digger, who descends into a well containing carbonic acid gas. The man in the well dies, not because his glottis is closed by spasm, as has been asserted, but because there is no oxygen in the well to be carried to the brain. It is indifferent to him whether his glottis be shut or open, since there is nothing to enter in that can do him good or harm; he dies from want of oxygen; and it may be, that the carbonic acid, if it enter his lungs, may do some mischief there; an indifferent mischief in the greater mischief.

I said that asphyxia is black blood in the brain—not in the sinuses and veins of the brain, but in the capillary part of the vascular system of the brain.

The greater part of the whole sum of the blood, variously computed to be about thirty pounds, exists in the systemic part of the vascular circle. Only a small portion of it is in the venous side. In the lungs, for example, where the pulmonary artery is a vein, and the pulmonary veins arteries, there is a great excess of the aërated, over the quantity of carboniferous blood, for not only is the capillary system full, but the venous system is full. But the carboniferous blood of the femoral, of the iliac, of the portal vein, and the cava, produces no asphyxia; nor is it true that, in death from carbonic acid inspired in a well, the demise depends upon the presence of black blood in the trunk or members; it depends upon its presence in the brain, particularly the respiratory, oxygenating brain, whose pneumogastric branches, and all other sources of respiratory innervation, are suspended and cut off indeed, of their force, because their neurine is flooded with carboniferous blood in which there is no power to extricate the biotic force—the nervous force, or neurosity, as M. Cerise denominates it.

If it be true that there is a valve on the left side of the auricular septum, it must be that its purpose is to prevent regurgitation of the blood from left to right. It could have no other use or design.

Even in a case where greater power of the right auricle impels a portion of the black blood through the valved orifice, any resistance offered by the valve must *tend* to diminish or prevent the transit from right to left.

If in any such case, the plane of the septum auricularum be rendered horizontal, by placing the child upon its right side, the blood of the left auricle must *tend* to close the aperture by pressing the valve down, and keeping it down. The blood has gravitation, and its law of gravitation is as rigorous in the auricle as it would be in a cup, or in the air. Its weight must shut the valve, or *tend* to shut it, if any valve exist. But, with a shut valve, all the blood of the auricle must pass to the right ventricle, and so to the lungs to be aërated. It cannot pass the lungs without becoming aërated if the nervous power is intact. But, if the blood becomes truly aërated, it becomes oxygeniferous, and, transferring the oxygen to the capillaries of the brain, will there extricate the biotic force in a normal manner. All the irregular and diseased innervations depending upon the antecedent carboniferous quality of the blood in the encephalic capillaries must vanish before the steady innervative streams that proceed from a healthy brain, duly supplied with its quantum of oxygen.

There are many of my medical brethren who deny that my explanation of cyanosis neonati is correct, or even philosophical; contending that cyanosis is a status of the lung, or of the vessels of the heart, bringing about a modality of the lung alone; or a backing of the blood into the whole venous side of the circle, and a detaining of it in the capillaries; while I aver that the condition of the lung, or of the trunk and members, is nothing in the category, or rather a mere accident, which relates, in fact, only to the state of the brain.

I am quite conscious that a man's opinion cannot determine the least of Nature's laws to operate this way or that; and St. Matthew tells us, "Neither shalt thou swear by thy head, because thou canst not make one hair white or black." While, therefore, one gentleman sees only in a contracted pulmonary artery, or in a transposition of vessels, a cause of cyanosis, I am not to expect that he will come over to my way of thinking, because I think thus or so, even had I the authority and power of the man of Pergamus, who ruled us for fifteen hundred years.

I am, however, less concerned to witness the acceptation of my rationale, than the adoption of my precept. If they will turn the cyanosed neonatus upon its right side and shut down the auricular valve, I ought to be satisfied; and, indeed, my distinguished friend, Prof. Wood, recommends the practice, while he dispraises the principle upon which it is founded.

Nevertheless, I admit that I sincerely desire to find a reasonable acceptation of my rationale; less perhaps on account of its application to the undeniable self-demonstrating instances of blue disease, than to the treatment of certain obscure, and more questionable forms of the accident, which I shall now proceed to mention.

In order to explain my meaning more clearly, I shall relate cases that occurred to me a few years since, and upon which I put a construction that perhaps will not be admitted by those who oppose my rationale of cyanosis, either as to its mechanism or its real nature.

A lady had given birth to a child, apparently healthy. She was soon afterwards attacked with fever, which produced in her a series of distressing nervous symptoms. The young child, after many days, became indisposed with what seemed to be a bronchial catarrh, which was rebellious under the treatment. Dr. Bridges saw the child with me several times. It grew alarmingly ill. It was affected with a vast, troublesome collection of unexpectorated bronchial mucus, that threatened speedy suffocation by filling the air-tubes and trachea. Upon entering the apartment on one occasion, I found it in the arms of the monthly nurse, sorely oppressed and nearly insensible. It was dying—or, rather, I deemed it dying.

My impression from inspecting the child was, that it was moribund; and I still believe that the condition was that of the moribund, and that its life could not have been protracted beyond one or two hours, but for remedies employed to rescue it.

After observing it for some time, and noticing a livid areola about its mouth, I took it from the nurse to inspect it more closely.

The precise processes of thought by which I arrived at a conclusive opinion, have now escaped me; but I was led to imagine that the whole of the phenomena ought to be referred to a state primary in the brain, and not to a state primary in the bronchial mucous-membrane. I supposed that the sources of innervation becoming modified by the presence of carboniferous blood in the brain-capillaries, the organs had suffered in consequence of the cessation, or irregular action of the administrative power.

Upon cutting, in a surgical operation, certain branches of the trifacial nerve, the eye becomes instantly inflamed. Dr. J. Warren says that, under etherization, the conjunctiva is often injected with blood. The same thing occurs in asthenic fevers. So, in any hindrance of the current of the pneumogastric nerve-force, the lung might likewise become the seat of consecutive disorder. I was convinced that the child's foramen ovale admitted its venous blood to the systemic side of the circle, thus vitiating the biotic power of the nervous mass of the child. I turned it on its right side, and kept it there. In a few moments it was relieved, and in a very short time gave no further reason for alarm, or concern of mind. In fact, the right lateral decubitus cured it, and that right speedily. This is a fact.

In the month of January, 1846, I attended Mrs. H———, at the Indian Queen, South Fourth Street, in a confinement in which she gave birth to a healthy child.

As she was ill many days with a fever, I gave but little attention to the child. It was between two and three weeks old, when I was summoned to it by three rapidly repeated messages. I found it insensible; affected at intervals of one or two minutes with convulsions, in which the head rotated to the right in strong extension; the right arm, stiffened, was elevated as strongly as possible by spasmodic innervation of the deltoid and triceps, while the left arm, also stiffened, was pointed downward and outwards. The inferior extremities were also affected with rigid spasm. The mouth was open, and could not be closed, but by force. The pulse was feeble, and the respiration low, except when troubled by the recurring spasm. Many persons surrounded the infant, which was on its back on a pillow, supported on the lap, and supposed to be nearly dead.

The child had been well but a short time before. The attack had been a sudden one.

Upon contemplating the child, which had two or three attacks of this spasm or convulsion while I was looking on it, I reasoned with myself as to the probable cause. There was no assignable hygienic causation.

Its mouth was bluish, though not in a very marked degree.

I took the child on its pillow, and laid it on my knees, in order the better to inspect it. I reflected as follows: here is a faulty innervation of the muscles of the head, neck, arms, legs, and lower jaw; with suspended consciousness. Are the parts in fault, or is the brain in fault? Whence these irregular intromissions of nerve-force into the organs? Is the nervous mass imperfectly oxygenated because the child sends its carboniferous blood into the left auricle, and so to the brain? Let us try that point.

I laid it on its right side in the cradle, its trunk elevated at about 15°, and I said, "leave it in this position until I return. Perhaps it will die very soon; but I have some reason to hope it may be saved, if you should not change its position. I shall be absent three hours. Do not venture to move it, until I come again." In the mean time while I remained, it changed its appearance speedily and visibly for the better; it had no return of the spasm. It fell into a calm sleep, and was perfectly well when it awoke. It required no further cure!

Was this a *post hoc*, and not a *propter hoc* cure? Who can say so? The treatment was reasoned beforehand, and the result looked for.

As well might it be said that every therapeutical cure by emetics, cathartics, or narcotics, or diuretics, is a *post hoc*, and not a *propter hoc* cure.

The blood in the auricle or ventricle is not exempt from the laws of matter; it gravitates as absolutely there as in a teacup, or in the air. When I lay a child upon its right side, gravitation of the blood is inevitable; and since the valve is as delicate as the arachnoid, and light as thistle-down, the smallest drop resting upon it could close, as the slightest force could open it.

In this case, I brought the plane of the septum auricularum to be a horizontal plane; I compelled the blood of the inferior cava to rise in a vertical current to the fossa ovalis, and thus lessened the power of Eustachi's valve, to direct it upon the fossa ovalis. When I shut the valve down by the weight of the superincumbent blood, all the blood of the right auricle passed through the iter ad ventriculum, in order to be breathed upon in the lungs. It is probable that half a dozen systoles of the heart had scarcely been effected, before the oxygeniferous streams had reached the neurine, and waking into orderly and healthful force, the before hebetized innervations of the child, all the dependent organisms and organs resumed their healthful movements and life-manifestations.

Nov. 20, 1847, I was called to the child of Mr. H——, in Pine Street below Eighth. This child, a female, was born in October, 1847, and was now six weeks old. Upon reaching the rendezvous, I was pained to find the infant dangerously ill with catarrho-pneumonia, so far advanced, that I informed its mother it was probably too late for me to do it any good service.

The bronchial tubes and the trachea were oppressed with a great quantity of mucus, which so obstructed the respiration, that the child coughed at *every* breath, which was very scant, *saccadée*, and repeated sixty or seventy times per minute. Percussion and auscultation of the chest—careful examination of the abdomen—inquiries into the rate of the pulsations, both by feeling the radial pulse, and by auscultation of the heart, led me to the painful expectation that my friends were about to suffer the loss of their daughter. I prescribed for it, under a diagnosis of catarrho-pneumonia. Some hours afterwards I repeated my visit. It was no better.

Upon taking the child, which was on a pillow, and resting it on my knees in order to see it better, I found it in great danger of suffocation. Every breath was that compound of coughing and crying, which I cannot describe, but which every physician has observed. Upon inspecting it, I observed a livid areola about the mouth. The feet were bluish, as well as the finger-nails. It is true that such blueness might depend, and did in part depend, on the saburral state of the pulmonary mucous membrane—smeared as it was with mucus, and the tubes partly filled up. But, as the attack had been sudden—too sudden to be conformable to the normal march of such maladies, I reflected that the fault might not be primary in the respiratory mucous membrane, or pulmonary texture, but rather in the brain, which had lost its power of maintaining the status sanitatis in the lungs. I deposited the infant on its side, as for the treatment of cyanosis neonati. It seems to me that the valve of Botalli instantly fell down upon the foramen ovale, and that the carotid and vertebral injections of the brain immediately began to be thoroughly oxygeniferous. The administrative nervous mass commenced anew its government of its provinces, and, in a short time, the symptoms of the disease had vanished; I found, in the morning of Nov. 21, that no further treatment was necessary. I cured the broncho-pneumonia by shutting Botalli's valve, just as I should cure a conjunctivitis, by restoring the integrity of the trifacial branch cut off in a surgical operation on the face, and the loss of whose innervative current might have determined the conjunctival inflammation.

The objectors do not deny that the fœtal circulation, up to the first act of respiration, is chiefly directed through the foramen ovale and the arterious duct, and that it is so indispensably, and only because the operculum is raised. They cannot deny that the aperture virtually exists after birth, even for many days—nay, in some, during a long lifetime.

To deny that the two symmetrical halves of the heart may act asymmetrically and asynchronously, is to deny an admitted truth. To deny the effect of such dissidence in time and force appears to me to be but a mere denial.

I had many years ago charge of the health of a young woman, who labored under frequent attacks of cyanosis. She was often threatened with sudden death. In the intervals she appeared to be in good health, earning her bread by the needle.

One day, while much indisposed, she sat up in bed, eating a dinner of codfish. She suddenly fell on her side dead, in her 28th year. I found a foramen ovale, into which I could put a swan-quill.

In the heart of the Archduke Joseph, the cyanosis had coincided all his life long with an open foramen ovale.—See *Gintrac*, p. 228.

If in my own heart there be an aperture as large as the end of my finger, it is indifferent to me in respect of my health, while the two auricles contract symmetrically. But if asymmetrically, then I am liable to sudden illness, or even sudden death. My patient probably flooded her medulla oblongata with carboniferous blood, and ceased to breathe in consequence of the annihilation of that peculiar force that is evolved from the medulla.

How often have we seen similar states of the system brought about in attacks of puerperal eclampsia?

In this disease, an impetuous sanguine circulation gives rise to unmeasured, I had almost said explosive, evolutions of biotic force. In eclampsia, the spasm and convulsion of the whole system, and particularly of the diaphragm, which often, during the paroxysm, makes aspirations of only three or four cubic inches of air, allow the carboniferous streams to overflow the encephalon. Under this want of aëration, the face gathers blackness apace—the protruded tongue is of a deep purple, and a true asphyxia intervenes to save the life of the patient; so that the sooner the blackness of the features and tongue come to assure us of the arrest of the cerebral excitation, the sooner is the patient to be extricated from her perilous predicament.

If the medulla oblongata be overwhelmed with black blood she dies: sometimes this is the case, and she dies outright, no trace of lesion being discoverable in the brain.

Here we have no good and reliable sources of medication, save those that serve most rapidly and powerfully to diminish the momentum of the sanguine circulation in the encephalon, of which venesection is to be before all others preferred.

A proper venesection, executed before the asphyxia is established, in general prevents that consummation, by substituting a state of deliquium for the otherwise inevitable asphyxia of the eclampsic paroxysm, a far less dangerous and more speedy way of escape: less dangerous, since the sanguine engorgements and retardations coincident with the cyanosed state of the brain in eclampsia, expose the sufferer to inconvenient effusions or extravasation.

As to the right lateral decubitus for the new-born child in cyanosis, no doubt rests on my mind, after multiplied experience since 1832, now twenty years. I am not disappointed by finding the treatment sometimes unsuccessful, because, when it is so, I can with confidence believe that failure to change the blood is effected through some other agency than that of an open and used foramen ovale.

In the son of Mr. A. B——, I detected the existence of cyanosis neonati, and relieved the child, but could not cure it by my method. A series of diseased innervations, bringing the whole constitution into ill-health, continued to manifest themselves, notwithstanding all the precautions I could devise, and I announced, long before the death of the infant, which lived for several months, in addition to a patent foramen ovale, the existence of an aperture in the septum ventriculorum, which was verified by the examination of its heart after its decease.

In a similar manner I announced in Mr. J. B——'s child, an open foramen ovale, as the cause of convulsive attacks which led at last to an effusion within the encephalon with separation of the sutures, and evident fluctuation, which opinion was verified necroscopically.

Professor Wood will bear me witness of the sudden and marked and indubitable relief and cure of Mr. H. W——'s infant, apparently dying with cyanosis, when it was placed in position.

In the eldest son of Mr. S. B——, jun., the respirations were but four to the minute; the pulse was gone, and the child within two or three minutes of its death, nay, deemed by some to have breathed its last. The recovery was almost instantaneous.

The same is true of Mr. H. K——'s son, with the exception that the case was not so extreme; so also of Mr. Rich's child, Mr. J. W——'s, and many others.

I beg leave to refer again to the letter from Prof. Eve, at p. 614, reciting a case of cyanosis treated by him. A letter from Dr. Casey, of Hartford, Conn., informs me of a violent case successfully treated by the position. Dr. Hains, of this city, and many others, have succeeded in like manner. Prof. Charles A. Lee, of Geneva College, informs me that the treatment is well known in Western New York.

I can by no means adopt the views as to the essential nature of the malady, set forth in Prof. Wood's late work on the Practice of Physic.

That author, like others, appears to me to have mistaken the symptom, to wit, the *blue color*, for the disease, which, as I have so often said, is essentially a failure of innervation from absence of oxygen in the brain. He doubts the causation as dependent on the mixture of the two kinds of blood in the heart.

I cannot understand that the leg or arm should suddenly die for want of oxygeniferous blood; and I cannot perceive how the constitution can live, if the nervous mass, which is the essential Ens, be dead or inert, as it certainly is when only the carbonized blood of the veins circulates in its capillary vessels. M. Gintrac himself, who originally made four kinds or species of cyanosis—of which the first consists of the *mélange du sang noir et du sang rouge*, and the second a *coloration bleue également constituée par ce mélange*—comes to the true conclusion at last, that, instead of four species, there is but one, although he calls that one two.

Prof. Rokitansky, in his *Patholog. Anatomy*, vol. ii. Part I. p. 510, gives an article on cyanosis, in which he treats at large of the various kinds of that affection, whether as depending on faulty development of the heart, or on causes extrinsical as to that organ. He says: "A distinction is generally drawn between an organic disease of the heart acquired in the later periods of life, occasioned by disease of the lung, and that form of cyanosis dependent upon congenital malformation of the organ. The latter is called cardiac cyanosis. It will appear that the essential cause and character of both are the same. Cyanosis occurring in cases of congenital malformation of the heart has been mostly attributed to the mixture of the two kinds of blood, or rather to the passage of the venous blood into the arteries either by way of the ventricles, or the auricles, or the vessels themselves; but, it has been common to refer this commingling of the currents and the accompanying symptom of cyanosis to a deficiency as to the septa of the heart. We are of the opinion that cyanosis *always* depends, not upon the mixture of the two kinds of blood, which is in many cases problematical, and in some takes place in a directly opposite direction to what is supposed, but on the impeded reflux of the venous blood into the heart, and a consequent habitual, or, in some instances, intermittent engorgement of the venous and capillary systems; and that herein all the varieties of cyanosis, however differing as to their original and acquired abnormal conditions of the heart and lungs, coincide, and may without violence be classed together."

I shall not here reproduce all M. Rokitansky's arguments and statement of facts ingeniously brought to the support of this doctrine. I shall merely state that the opinions set forth in this chapter as to the consecutive nature or accidental nature of those contractions of the pulmonary and other orifices of the heart, appear to me undeniable, and that it is always reasonably to be expected that an uncured attack of cyanosis neonati will lead to a constriction of the pulmonary artery, just as the free expansion of the pulmonary artery, after the first aspirations of the neonatus, leads to the abandonment of the ductus arteriosus and its early conversion into a ligamentum teres.

Should this page be at some future day honored by the regard of that distinguished writer, the author would beg leave to direct his attention to the events and phenomena that occur in those cases in which a sudden coagulation of blood fills the right auricle and ventricles with a clot that is moulded by the cavities which it fills. Many examples are to be met with of these coagulations, some of which prove instantly fatal, while others admit of the prolongation of an ineffectual struggle for life during a period of from one to twenty days, according to my own clinical observation.

Now in the instance of a cardiomorphous clot, as above proposed, the blood is most effectually detained in the venous side of the circle, far more so than can be pretended of the intermittent forms of cyanosis, of which M. Rokitansky speaks. Yet, as long as the patient continues to survive, he continues to thrust betwixt the outer superficies of the clot, or false polypus, and the inner walls of the auricle, tricuspid valve and ventricle, as well as the pulmonary artery, portions of blood that become thoroughly oxygenated in the lungs—for the respiratory effort is one of desperation—and the blood is probably charged to its very highest capacity with oxygen. It receives enough to maintain in the neurine the extrication of innervative force until the gradual augmentation of the clot cuts off the power of the circulation. In these cases the blue color, the cyanosis, the *blausucht*, is scarcely to be discovered, the patient being on the contrary ghastly pale and sunken. If this be a true representation, I am right in denying that cyanosis depends on *backing* the blood on to the venous segment; for such a heart-clot as I have seen, can obstruct the venous tide as effectually as a ligature cast round the cava and drawn almost tight could do.

If Prof. Rokitansky and Prof. Wood's views are just, then we ought to have in the case of the pre-enthanasial clot the most striking example of the cyanosed state, for, when the heart becomes thus tamponed with a cardiomorphous coagulum, the whole of the venous side of the circle is stopped, and the black blood backed into the capillaries. A small endocardiac clot must have the same power to produce mechanical obstruction as contraction of the pulmonary artery; a large one is equivalent to a ligation of the cava.

I deny not that a constriction of the pulmonary artery may produce cyanosis. Whatever restricts the action of the venous heart, must do so. Great collections of fluid in the thorax produce it. Pressure upon the heart from dropsy of the pericardium; extensive injuries of the lungs from tubercular degeneration; suppurations, and large vomicæ; cynanche-trachealis, or pseudo-membranous laryngitis; pneumothorax; atelectasis pulmonum; a host, indeed, of accidents and diseases that ruin or disable the respiratory machinery, may produce cyanosis. But of these I have not spoken. I confine my observations and my method to the persistent use of the foramen ovale after birth, a case in which the blood of the veins takes the course originally followed by that of the placenta.

There is no other treatment for cyanosis neonati than that I have suggested; at least, there is no other reasonable treatment. Venesection, emetics, purgatives, diuretics, soporifics, baths, counter-irritants, cannot cure it.

When cyanosis has introduced epiphenomenal affections, they may be treated. These affections will be found to relate chiefly to a state of the pulmonary circulation and excretions.

In some instances, I have applied a large leech or two to the region of the heart, in order, haply, to assist in overcoming the pulmonary or cardiac engorgement, so apt to coincide with failure or disorder of the biotic power of the medulla oblongata. In general, however, when the malady has depended on the injection through Botalli's foramen, I have been content to place the infant in the proper position, and trust to that alone for the cure.

CHAPTER XXV.

SUPPLEMENTARY.

CASE.—Mrs. R. was in violent labor, which had continued long, but without any effect. Dr. B. requested me to visit her with him.

The vagina was pressed forwards towards the symphysis pubis, by a tumor behind it, filling up the excavation of the pelvis and preventing the descent of the head.

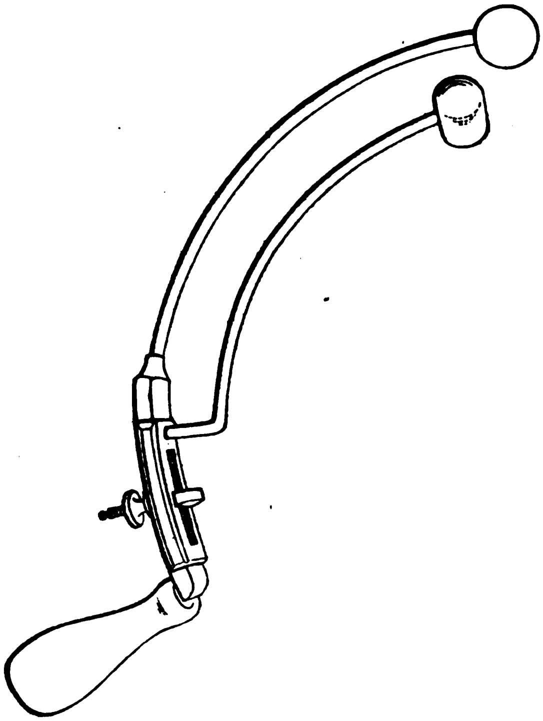
I learned by examination that this tumor consisted of a great mass of intestinal convolutions that had fallen down below the strait, and that was kept there by the violent tenesmus, as well as by pressure of the gravid womb above it. Indeed, the mass was to a certain extent incarcerated within the excavation of the pelvis. The efforts of the patient to bear down upon her pains were most violent, and the distress accompanying them apparently intense.

I introduced my fingers into the lower part of the vagina, and thrusting the posterior wall of that tube backwards, got the points of the fingers beneath the tumor, which occupied the recto-vaginal *cul-de-sac* of peritoneum. A little patient manipulation caused portions of the gut to ascend into the abdomen, and in a short time the whole mass fled upwards above the brim, whereupon the expulsive efforts of the womb being no longer opposed by it, the child was speedily and safely born.

Before closing this volume, I wish to make the Student acquainted with the appearance and use of an instrument recently invented by Dr. Henry Bond, an eminent medical practitioner of this city, and which is designed for the purpose of restoring the womb to its proper situation in cases of its retroversion.

The instrument, of which I annex a figure, half size, (Fig. 131,) consists of two arcs of circles of different radii; the inner one is terminated by a small oval piece of ivory; the outer terminates in a small ivory ball. The exterior arc is formed at its lower extremity into a plate-piece in which is a mortise. To the end of the plate-piece is attached an ivory handle, by which it may be conveniently held. See the figure. The inner or smaller piece is attached to a sliding-piece, also mortised, overlapping by its edges the mortised plate-piece, and secured by a clamp or pinch traversing the mortises, and fastened or loosened by turning the thumb-piece. If the thumb-piece be unscrewed, the clamp may be turned lengthwise, and the arcs are then easily separated.

Fig. 131.



In order to use the instrument, the arcs should first be separated, and the ivory ball on the largest arc introduced into the rectum, while the oval one on the smaller arc should be introduced into the vagina.

By sliding the smaller arc upwards, the two balls can be place opposite to each other; or the vaginal arc can be set a quarter of inch, a half inch, or an inch lower down than the one that is in the rectum.

Upon being adjusted, and firmly secured by turning the thumb-piece, it is manifest that the two balls cannot be separated from each other, and that if they be moved upwards, parallel with the curve of the sacrum to the height of the promontorium, they must carry the retroverted uterus before them, and thus serve very effectually and easily to reposit the dislocated organ.

In a difficult case of retroversion, which I lately saw in consultation with Dr. Bond, I in vain made repeated attempts, in which I employed great perseverance and force, to get the retroverted fundus out of the peritoneal *cul-de-sac*, the bottom of which it had forced almost down to the vulva. In this case, Prof. Simpson's womb-sound could not be made use of, on account of the position of the os uteri, which was quite as high as, and close to, the top of the symphysis pubis, and so firmly pressed against it as with difficulty to admit of reaching the os tincæ with the indicator-finger. I could by no means succeed in several attempts that I made, to introduce the probe-point of Dr. Simpson's womb-sound into the os, for the canal of the cervix uteri made an acute angle with the posterior face of the symphysis pubis, and being in close contact with the top of the bone, it is clear that I could not introduce the end of the probe into it. I did bend the womb-sound near to its probe-point, so as to give it the shape of a blunt-hook, and, introducing the hook within the os uteri, endeavored to draw the vaginal cervix down the symphysis, but I could not make it move, and was obliged to abandon the attempt.

Upon the failure of these efforts, the caoutchouc bottles were made use of as pessaries, as recommended by M. Hervez de Chegoin, in the *Mém. de l'Acad. Roy. de Méd.* They doubtless served very usefully to effect a partial elevation of the fundus; in the mean time the engorged uterus, whose length could not have been much less than five inches, became gradually less hyperæmical, so that Dr. Bond was enabled, after three or four days, by means of the very ingenious instrument whose figure I have here given, to lift the fundus out of its dislocated position, whereupon the unfortunate lady was immediately relieved of a most distressingly painful accident.

A reviewer, in the January number of the *British and Foreign Quarterly*, treats Prof. Simpson, in my opinion, with uncalled for severity on acccount of his womb-sound, of which I have above spoken. There is little danger to be apprehended of mischief resulting from the use of that beautiful instrument in competent hands; and the facility with which an ordinary case of retroversio uteri may be relieved by it, together with the absolute safeness of its application, in the proper cases, are qualities so very valuable, and the whole operation is so much less disquieting to the fastidious patient, than the ordinary methods of treatment, that I think the profession should feel in the highest degree indebted to Dr. Simpson for his admirable invention. As to the uses of it in diagnosis, it appears to me, since I have become acquainted with it, that it is an indispensable article in the apparatus of the physician and surgeon.

And now, that I have come to write the last paragraph of this volume, I take occasion to bid the Student God speed in his arduous path; to exhort him so to direct his course, that he may elevate himself to the highest rank of the Scholar-class, by which alone he can hope to reap the only and true reward of a life spent in the service of them that are in pain, in fear, or in danger of death. And lastly, I assure him that he can never learn too much of the opinions and experience of mankind, gained during the lapse of ages, on the subject of Disease and its Remedies. If he would, therefore, become a safe and useful minister in this art, let him never rest satisfied with clinical observation and experience alone, but let him devote daily a fair proportion of his time to the Medical Library.

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